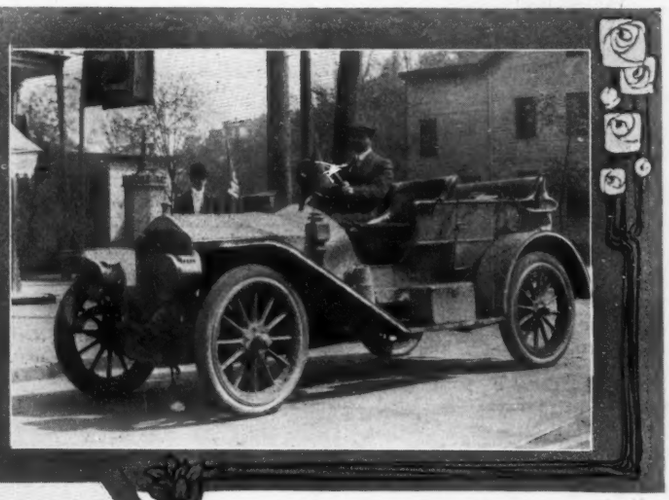
VOL. XV. No. 19 CHICAGO, MAY 13, 1909 $3.00 PER YEAR

MOTOR AGE

FRANKLIN—PULLMAN—PEERLESS—PULLMAN

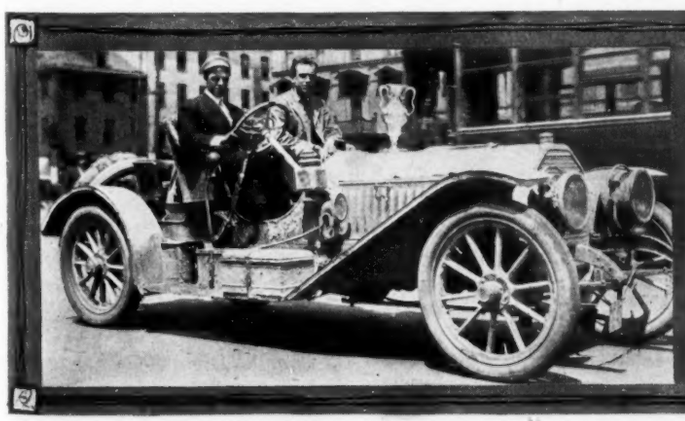
No. 12 FRANKLIN, WINNER CLASS A



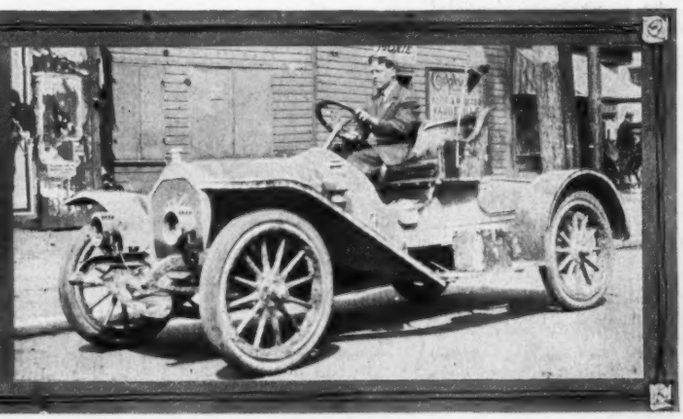
No. 4 PULLMAN WINNER CLASS B

HARRISBURG, PA., May 7—The 4-day reliability contest conducted by the Motor Club of Harrisburg was completed last night and at 9 o'clock this morning the complete returns of the technical committee were made public, these showing four winners. No. 12 four-cylinder Franklin, driven by Carris, won the class for touring cars costing $2,250 and over with 21 points penalty. Victory in the touring-car class under $2,250 rested on Car No. 4, a 30-horsepower Pullman driven by A. B. Cocklin, a private citizen, the car having 56 points penalty. As in the touring car division, so in the runabout classification, there were two classes: for runabouts costing over $2,000 and those costing under. In the runabout class, $2,000 and over, No. 15 Peerless, a 50-horsepower six-cylinder roadster driven by Ed Burnshaw, of Philadelphia, was the winner, with 58 points marked against it. In the small runabout division, No. 5 Pullman, a 20-horsepower car, piloted by J. D. Goodwin, was victor with 315 points against it. The respective awards for the different classes were: Franklin, governor's cup, donated by Edwin S. Stewart, of Pensylvania; Pullman touring car, silver trophy donated by the Harrisburg board of trade; Peerless runabout, national capital trophy donated by the Washington, D. C., motorists, and Pullman roadster, Harrisburg Patriot cup, donated by the Patriot, of

WHITE ON THE ROAD NEAR GETTYSBURG



No. 15 PEERLESS, WINNER CLASS C



No. 5 PULLMAN, WINNER CLASS D

No. 16 Maxwell at Top of Giant's Despair

Harrisburg. The trophies were all on hand before the start of the contest.

Final Standing of Run

The complete standing in the different classes is as follows:

CLASS A, TOURING CARS, $2,250 AND OVER

No. 12 — Franklin, Clayton S. Carris, 21 points penalty.
No. 10—White, Walter White, 96 points.
No. 1 — Oldsmobile six, Tom Berger, 218 points.
No. 2—Pullman, Robert Morton, 584 points.
No. 6—Rambler, F. W. Darnstafdt, withdrawn.
No. 11—Thomas six, M. R. Graupner, withdrawn.

CLASS B, TOURING CARS, UNDER $2,250

No. 4—Pullman, A. B. Cocklin, 56 points.
No. 8—Maxwell, C. E. Goldwaite, 327 points.
No. 9—White, W. B. Rheineck, withdrawn.

CLASS C, RUNABOUTS, $2,000 AND OVER

No. 15—Peerless six, Ed. Burnshaw, 58 points.
No. 3—Pullman, H. P. Hardesty, 382 points.

CLASS D, RUNABOUTS UNDER $2,000

No. 5—Pullman, J. G. Goodwin, 315 points.
No. 16—Maxwell, J. E. Sellers, 692 points.
No. 7—Middleby, E. B. Hume, withdrawn.

Of the fourteen contestants which started on the 694-mile run, ten were contending at the finish and took the outdoor and technical examination; two others were completing the run as non-contestants, these being the Middleby roadster and the Thomas light six. Two discontinued, these being the Rambler toy tonneau and the small White. Although from the standpoint of entries, the run was not so large as last year, yet from the severity of the test, the distance and other conditions, the run will take its place among the severest road tests to which motor cars ever have been subjected in America.

The first day's run of 153 miles from Harrisburg to Washington was comparatively easy with the exception of the 35 miles to Gettysburg over muddy rough roads and the last 17 miles over sandy road outside of Washington. On this run some stiff mountain work was encountered for 5 miles. The second day's run from Washington back to Harrisburg by way of Baltimore, Littletown, York and Lancaster, was a 170-mile trip over pike roads with waterbreakers all the way, excepting the last 15 miles, which was over rough stone and clay roads filled with water puddles.

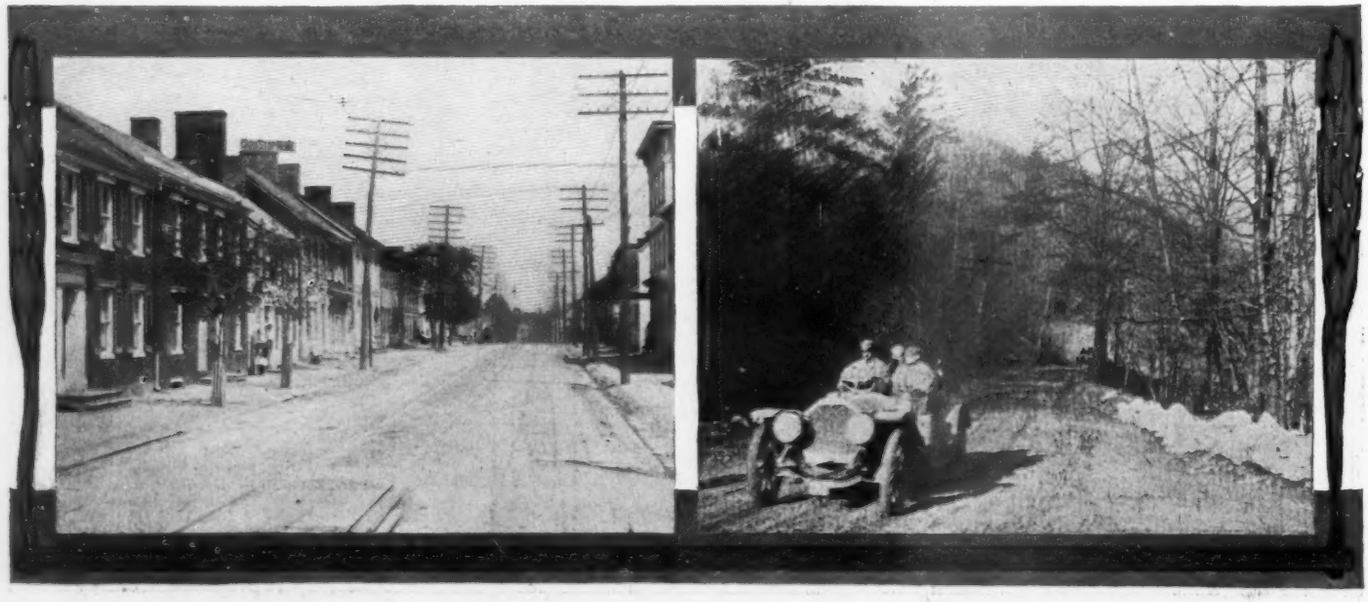
All Penalized On Time

The third day's trip, a run of 180.6 miles from Harrisburg to Wilkes-Barre, was a mud plug of the worst possible sort for the first 140 miles, the course much of the way lying along the banks of the Susquehanna river and its north branch. These roads had been deluged with rain for 3 or 4 consecutive days and their condition was worse than at the opening of March this year. These roads are nothing but clay of a gummy sort and, although on the surface they looked fairly good, there was no bottom and the contestants were compelled to go for miles on low gear.

To add to the discomforts, the contestants were run on a 20-mile schedule, so that not a single one of the ten escaped the point-a-minute penalty for being late at checking stations. Carris with his Franklin proved the most fortunate, being but 19 minutes late throughout the day. No. 4 Pullman had second honors, being 36 minutes late; No. 15 Peerless was third, 45 minutes late, and Walter White fourth, 50 minutes late. The amount of time lost by the other contestants is shown in the tabulation on the following page.

Battle of Giant's Despair

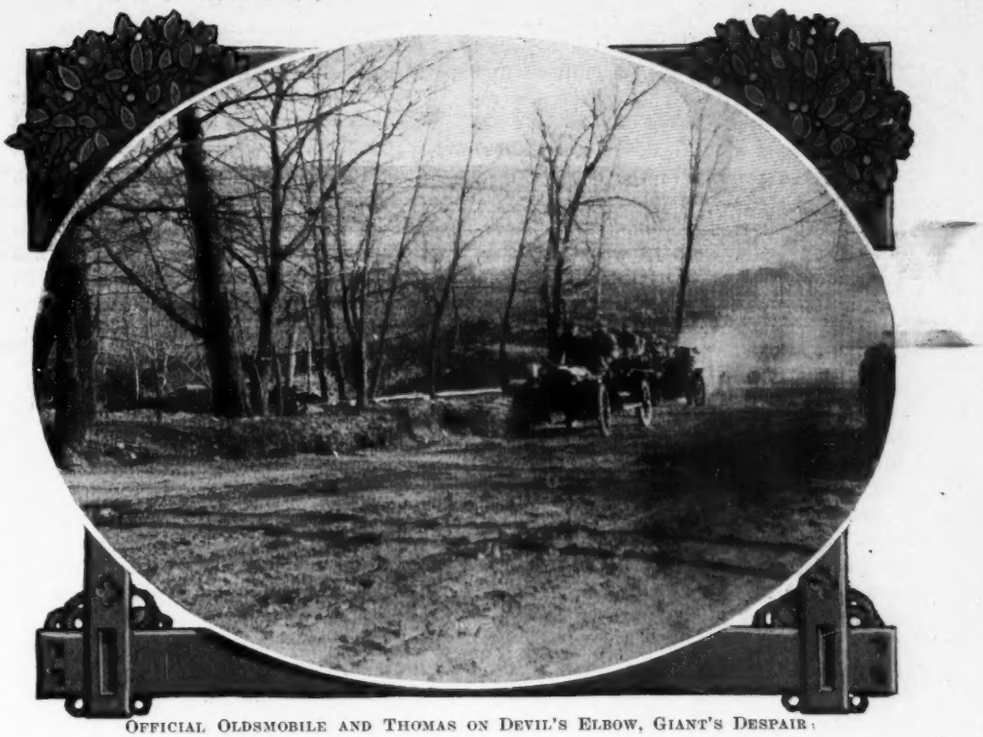
The fourth day's run from Wilkes-Barre back to Harrisburg by way of Giant's Despair mountain, Stroudsburg, Allentown and Reading, was the longest day's run



Main Street Frederick, Md., First Day's Tour

No. 15 Peerless at Top Giant's Despair

of the quartet, measuring 189.7 miles. It was from start to finish an ideal run on the 20-miles-an-hour schedule, the roads being perfect from start to finish. The difficulties of the day were climbing Giant's Despair mountain in the outskirts of Wilkes-Barre, this mountain being 1⅛ mile with a 700-foot rise, which necessitated taking on of water at the top in a few cases. After this was continuous mountain work over good roads, including the Delaware Gap for 65 miles. From this point to Harrisburg, approximately 125 miles, was nothing but state road over which the cars could scamper at any desired speed with not a water breaker to interfere. In spite of this, however, the day proved a somewhat costly one to contestants, not so much because of troubles, which developed during the day, but owing to the racking the machines had received on the mud plug of the previous day. As a result of which but three cars made the run without penalties, these being Morton's No. 2 Pullman touring car, the Carris Franklin, and the Peerless six. The others were penalized for making repairs which should have been made on the previous day, but time did not permit.



OFFICIAL OLDSMOBILE AND THOMAS ON DEVIL'S ELBOW, GIANT'S DESPAIR.

Work Day by Day

On the first day's run eight of the fourteen starters made the trip without penalties. On the second day's trip ten of the twelve which started on this day's run made a clean score trip. On the third day not a perfect score run was made and on the fourth day, as already stated, three cars made the run without penalization. In the technical examination there was not a car that did not receive penalty, the Franklin carrying off the honor with but 2 points against it. Close rivals were the No. 4 Pullman and No. 8 Maxwell with 4

FINAL STANDING OF CONTESTANTS IN HARRISBURG RELIABILITY CONTEST

CLASS A—Touring Cars Costing Over $2250

No.	Car and Driver	Time Penalties	Work	Tow Penalties	Gasoline Penalties	Oil Penalties	Water Penalties	Motor Stop Penalties	Seals Broken Penalties	Outdoor Test	Technical Penalties		Total Penalties
12	FRANKLIN G. S. CARRIS	19									BEADING ON FRONT FENDER LOOSE	2	21
10	WHITE WALTER WHITE	50	2 8	5			20		5		RIGHT REAR FENDER IRON BROKEN	6	96
											LEFT REAR FENDER IRON BROKEN	6	
1	OLDSMOBILE SIX TOM BERGER	104	4 44	5	10					5 DEAD MAGNETO	20 FOUR FRONT SPRING LEVERS BROKEN	20	218
											BROKEN AXLE TRUSS ROD	5	
2	PULLMAN R. MORTON	351	108	5	12	6	38	49	5	DISCHARGED DRY CELLS 2	LOOSE FRONT SPRING CLIP NUT	1	
											CENTER BOLTON LOOSE FRONT SPRING BROKEN	2	584
6	RAMBLER F. W. DARNSTAEDT										WITHDRAWN SECOND DAY		
1	THOMAS SIX M. R. GRAUPNER										WITHDRAWN THIRD DAY		

CLASS B—Touring Cars Costing Less Than $2250

No.	Car and Driver	Time Penalties	Work	Tow Penalties	Gasoline Penalties	Oil Penalties	Water Penalties	Motor Stop Penalties	Seals Broken Penalties	Outdoor Test	Technical Penalties		Total Penalties
4	PULLMAN A. B. COCKLIN	36	2	5			4				MUFFLER SUPPORT BROKEN	2	
8	MAXWELL C. E. GOLDTHWAITE	273	2	5		6 4	2 10	2	5 10		2 BRAKE RELEASE SPRING BROKEN	2	56
											RIGHT REAR FENDER SLIGHTLY DAMAGED	2	
											MUFFLER EXHAUST PIPE DISCONNECTED	1	
9	WHITE W. B. RHEINECK										WATER LEAK IN FRONT CYLINDER	1	327
											WITHDRAWN FIRST DAY		

CLASS C—Runabouts Costing $2000 and Over

No.	Car and Driver	Time Penalties	Work	Tow Penalties	Gasoline Penalties	Oil Penalties	Water Penalties	Motor Stop Penalties	Seals Broken Penalties	Outdoor Test	Technical Penalties		Total Penalties
15	PEERLESS SIX ED BURNSHAW	45		5							RIGHT REAR FENDER SLIGHTLY DAMAGED	2	
											LEFT REAR FENDER BADLY DAMAGED	5	
											CLUTCH STUD 1 1-4 INCHES OUT	1	58
3	PULLMAN H. P. HARDESTY	9 190	100 4 4					60	5		REAR AXLE TRUSS ROD BROKEN	5	
											RIGHT BRAKE RELEASE SPRING LOST	1	
											RIGHT FRONT SPRING SHACKLE BOLT LOST	2	382

CLASS D—Runabouts Costing Under $2000

No.	Car and Driver	Time Penalties	Work	Tow Penalties	Gasoline Penalties	Oil Penalties	Water Penalties	Motor Stop Penalties	Seals Broken Penalties	Outdoor Test	Technical Penalties		Total Penalties
5	PULLMAN J. G. GOODWIN	19 226	13 20	10				4		MISSING ON DRY CELLS 1	RIGHT REAR MUD GUARD DAMAGED	2	
											LOOSE REAR AXLE TRUSS ROD	1	
											CENTER BOLT REAR FRONT SPRING LOOSE	1	
											TWO FRONT FENDER IRONS BROKEN	12	
											SIX FENDER BOLTS LOST	6	22 315
16	MAXWELL J. E. SELLERS	6 354	2 56 228 4					10			RIGHT REAR WHEEL LOOSE	10	
											LEFT REAR FENDER DAMAGED	3	
											RIGHT FRONT FENDER DAMAGED	2	
											ONE LEAF RIGHT FRONT SPRING BROKEN	5	
											LEFT FRONT FENDER DAMAGED	8	
											LOOSE MUFFLER UNION	1	
											LOST FAN BELT	2	
											CUT OUT SPRING BROKEN	1	32 692
7	MIDDLEBY E. B. HUME										WITHDRAWN SECOND DAY		

points each, No. 10 White with 6 points and No. 15 Peerless, No. 3 Pullman and No. 2 Pullman with 8 points each, the remaining finishers having 22, 26 and 32 points charged against them. Only three cars suffered penalty in the outdoor test, which consisted of clutch test against a 6-inch curb, a transmission test to ascertain if all gears were in working order, and a motor test taking into consideration both systems of ignition, carburation, etc.

One of the road conditions which went against not a few of the contestants was the necessity of being towed out of mud holes on the third day. In anticipation of this condition Referee R. H. Johnston had ruled before the starting of the run that each case of towing would be given a nominal penalty of 5 points, and the tabulation shows that seven of the cars took this penalty on the third day, the three to escape being No. 3 Pullman, No. 16 Maxwell and No. 12 Franklin. The majority of the towing was occasioned by a sink hole outside of Williamsport, where quicksand was encountered. Other road penalties were incurred for taking on gasoline on the third day outside of checking stations, two cars suffering in this respect. Still a third road penalty was taking on water outside of checking stations, no fewer than six cars receiving penalties at the rate of 2 points a minute for this.

Penalties Are Inflicted

There was a penalty on the road at the rate of a point a minute for motor stops; also a penalty of 5 points every time a seal was broken; a penalty of 2 points per man per minute, or fraction thereof, for all work done on a car, whether repairs or replacements, and a penalty of 1 point per minute for lateness at checking stations. In the final examination by the technical committee the penalties were according to regular schedule announced before the start of the run.

The detailed happenings to the different cars on the first 2 days of the run were given on pages 6 and 7 of last week's issue, so only the troubles of the third and fourth days will be referred to at the present time. No. 1 Oldsmobile was compelled to take on gasoline outside of a control, taking a penalty of 10 points. This car suffered in the sink hole at Williamsport, the road being blocked by the Peerless, which was mired. It required 21 minutes to tow the Oldsmobile out. This car was penalized 104 points for being late. On the fourth day it received a total of 44 points penalty for work, 8 for repairing a broken fender and 36 for cleaning mud off the radiator and filling with water.

Pullman Strikes a Dog

No. 2 Pullman, on the third day, when nearing Williamsport, struck a dog, injuring the radiator so that in all 108 points penalty were needed for work, taking the radiator off and repairing it. The car got 351 points on time, 5 points for being towed out of the sinkhole, 12 points for taking on gasoline, 6 for taking on oil, 38 for taking on water and 49 for motor stop, while the radiator was being repaired.

On the third day No. 3 Pullman was penalized 4 points for work, due to tightening the clamp bolt on the steering knuckle. It lost 190 points on time. On the fourth day it had a road penalty of 4 points because of a broken rear axle truss rod, and an engine stop of 60 points due to tire troubles. No. 4 Pullman was penalized 36 points on lateness, 2 points on work, 5 points on being towed and 12 points for having to take water. On the fourth day there was a work penalty of 2 points required for tightening the stuffing boxes of the water pump.

No. 5, the small Pullman runabout, had no penalties on the third day except for being towed a couple of times and lateness. On the fourth day it suffered 20 points, required in repairing the two front fenders, both the irons of which were broken on the third day.

The third-day count against the No. 8 Maxwell consisted in turning a spring shackle. Its other penalties appear in the tabulation. On the fourth day it had 4 points penalty for twice oiling the brakes, also for engine stops and for taking on water.

Walter White, in a No. 10 White steamer, on the third day had 5 points for being towed and 20 points for taking on water outside of checking stations. On the fourth day he had 8 points penalty for repairing a broken fender.

Franklin's Mechanical Record

No. 12 Franklin had no mechanical troubles of any nature and was penalized 19 points for being late on the third day. No. 15 Peerless had no mechanical troubles of any nature, but was penalized 45 points for lateness on the third day and 5 points for being towed out of the sinkhole. No. 16 Maxwell had 228 points for work on the third day occasioned by replacing a front spring replacing a rear spring making one other spring repair and turning a spring shackle and inserting a new shackle bolt. On the fourth day it was penalized 4 points for tightening the arm of the steering knuckle.

Stoddard-Dayton Wins California Road Race

San Francisco, Cal., May 10—Special telegram—Northern California held its first road race at Santa Rosa, 50 miles north of San Francisco, on Sunday, and general opinion is that the affair was a great success. The chief honors of the day fell to a Stoddard-Dayton car, owned and driven by Ben Noonan, who is a well-known young business man of Santa Rosa. Second place, which carries with it the beautiful Moore trophy, was captured by a 1907 Stevens-Duryea big six, driven by Ontank, a San Francisco demonstrator. Third place went to a second Stoddard-Dayton, which was in the hands of Fred Wiseman, also a Santa Rosa boy, and well known as a racing driver during the past two seasons on many California tracks. Fourth went to the Acme, piloted by Fay Sheets, which caused a sensation when it tore over the finish line running on one of its front rims, upon which it had pounded along for more than a dozen miles. Fifth was a Buick Forty. Finally in sixth place came the Tourist, the Los Angeles car piloted by E. B. Ely. After these six cars had come in the race was declared off. The distance was about 50 miles, and the winning Stoddard-Dayton covered it in 1 hour 5 minutes. Other starters were: Thomas Forty, Speedwell, two Stearns, Comet and Packard. All reported tire trouble as the cause of their failure to finish.

PATHFINDER ON THE JOB

Philadelphia, Pa., May 8—At daylight this morning the pathfinders' car of the Quaker City Motor Club—a big-wheel, low-hung American Traveler—pulled away from the Hotel Walton en route for Pittsburg. The party of explorers consisted of Dr. Overpeck; W. C. Jackson, assistant pilot; George Parker, the Pittsburg-Baltimore record-holder, at the wheel, and Mr. Vogel, of the Stoyle-Vogel Co., local agent for the American Traveler. They will be on the road the entire week, during which time they will complete arrangements for the Quakers' big 5-day endurance run to Pittsburg and return, June 14-18. On the advice of up-state motorists, who know the ground thoroughly, a slight change has been made in the first day's route. From Pottsville, instead of going via Shenandoah and Bloomsburg, it was decided to travel via Shamokin to Sunbury, following the West Branch of the Susquehanna through Montandon and Milton to Muncy, where the original route is met. The change in route will not change the first-day mileage, which will odometer approximately 180 miles. An indication of the interest taken in the run by the people living along the route was given only a day or so after the publication of the itinerary, when the commissioners of Cambria county gave orders to put that portion of the old Philadelphia-Pittsburg pike running through their bailiwick in first-class condition. The Cambrians hope to have the new cross-state highway laid out through their county. The Williamsport board of trade has announced its intention of acting as hosts to the contestants and officials during the overnight stop in that city, June 14.

EIGHTEEN IN WASHINGTON RUN

Washington, D. C., May 11—Special telegram—Entries for the reliability contest of the Automobile Club of Washington closed at midnight May 10. Eighteen cars were nominated and the contest will undoubtedly prove the best ever held in Washington. The entries include two Oldsmobiles, two Mathesons, two Fords, Pullman, Stoddard-Dayton, Brush, Thomas-Detroit, Franklin, Columbia, Chalmers-Detroit, Packard, Wayne, Reo, Chase and Maxwell.

WORK ON COBE CUP COURSE NOW UNDER WAY

CHICAGO, May 11—Two big gangs of men started work this morning at Crown Point and at Lowell, Ind., repairing the course which will be used for the two road races of the Chicago Automobile Club next month—the Cobe cup and the Indiana trophy. The contractors have until June 5 to complete their work or forfeit $500 a day for each day after that, so it means hustle all the time. One gang started in at Crown Point building the new strip of road that connects the east and west legs, while the other is working out of Lowell at the other end of the circuit. It is a stupendous task, for the contractors have to convert the country macadam roads into boulevards with a smooth top dressing in which taroid is the main factor and which is expected to make a surface that will permit of unlimited speed, for it is the ambition of the Chicagoans to crack a record and with that idea in mind they are prepared to spend $30,000 to get a circuit that will be surpassed by none.

The usual objection to repairing the course came up Saturday just as the contractors were preparing for their task. A Lowell citizen named Foster appeared before the county commissioners and protested against the roads being spiked, claiming that while the result was satisfactory for the time being that later on the road would be in worse condition than before they were touched. He asserted that the taroid used to fill up the holes would be pulled out by the hoofs of the horses. The contractors, however, convinced the commissioners that it is the intention to make the circuit permanently good, so that no further trouble is anticipated.

Success for the races is guaranteed by the way the entries are coming in. Up to last night there had been fourteen actually made for the two events, accompanied by the cash. Six of these are in the Cobe cup and eight in the Indiana trophy, while there are other prospectives that make it certain that there will be full fields in both races. The latter part of last week the Buick company filed six nominations, three in each event, naming Strang, Burman, De Witt and Chevrolet as its drivers. Chevrolet will drive only in the Cobe cup, while De Witt will be only in the light car race. On Friday four nominations were made by the McDuffee Automobile Co., of Chicago, agent for the Stoddard-Dayton, which named two cars for each event. In the Cobe cup the new 60-horsepower speedster model will represent the Stoddard, with C. A. Englebeck, of Chicago, and Bert Miller, of Dayton, as drivers. Today E. A. Hearne, of Chicago, named a 45-horsepower Fiat. He says two more will be nominated. Two Marions also were entered by H. E. Stutz, of Indianapolis.

More entries are looked for this week. The Chalmers-Detroit nominations are expected, while the Nordyke & Marmon company, through H. H. Rice, who was in Chicago Saturday, announces it will put two cars in the Indiana trophy with Harry Stillman and R. W. Harroun as drivers. Henry Ford, too, states he will make a couple of entries. As the entry list stands at the present time it reads as follows:

COBE CUP

Car and driver	Entrant
Buick, Lewis Strang	W. J. Mead
Buick, L. Chevrolet	Buick Motor Co.
Buick, R. P. Burman	Buick Motor Co.
Stoddard-Dayton, C. A. Englebeck	McDuffee Automobile Co.
Stoddard-Dayton, Bert Miller	McDuffee Automobile Co.
Fiat, E. A. Hearne	E. A. Hearne

INDIANA TROPHY

Moon, Phil Wells	Moon Motor Car Co.
Buick, L. Strang	W. J. Mead
Buick, G. De Witt	Buick Motor Co.
Buick, R. P. Burman	Buick Motor Co.
Stoddard-Dayton	McDuffee Automobile Co.
Stoddard-Dayton	McDuffee Automobile Co.
Marion, C. E. Stutz	H. E. Stutz
Marion, A. Monsen	H. E. Stutz

DETROIT DEAL EXPLAINED

Detroit, Mich., May 10—As there is considerable misunderstanding as to just what the nature of the Studebaker-E-M-F deal was, it is stated authoritatively that Fred S. Fish and Clement Studebaker, Jr., purchased the stock of B. F. Everitt and W. E. Metzger in the Everitt-Metzger-Flanders Co., and that, further, the Studebaker Automobile Co. has contracted to purchase and market the entire output of the E-M-F 30 cars after September 1. Hayden Eames, general manager of the Studebaker Automobile Co. of Cleveland—an incorporation entirely separate from the wagon company of South Bend, though controlled by members of the latter concern—and Clement Studebaker, Jr., treasurer of the Studebaker Brothers Mfg. Co. of South Bend, succeed B. F. Everitt and W. E. Metzger on the directorate of the E-M-F company. Walter E. Flanders retains his title of general manager and succeeds to that of president, previously held by B. F. Everitt. To set at rest any reports to the effect that the Detroit concern will hereafter be dominated by the Studebaker company, it may be said that the latter concern owns no stock in the Detroit company. Two individuals succeed two others only, and the stock transferred amounts to only one-third of the capital stock of the E-M-F company. C. L. Palms, Dr. J. B. Book and W. E. Flanders constitute three out of five of the board of directors, hence the control remains in Detroit.

RACING AT BIRMINGHAM

Birmingham, Ala., May 7—At the track meet here today Tilford Cowell, of Montgomery, driving a Chalmers-Detroit, won the 100-mile race, the feature of the card. He was stopped in the fifty-fifth mile after his only competitor, Lewis Strang, in the Buick, had run into the fence and been put out of the running. Cowell also won the Birmingham district championship, defeating Scully in a Stanley steamer. Summaries:

Five miles, Birmingham championship, open to Alabama drivers—Tilford Cowell, Chalmers-Detroit, won; Scully, Stanley steamer, second; time, 5:45.

Five miles, open — Lewis Strang, Buick, won; Tilford Cowell, Chalmers-Detroit, second; time, 5:32 2-5.

100 miles—Race awarded to Tilford Cowell, Chalmers-Detroit, in fifty-fifth mile because of accident to Strang; time for 55 miles, 1:07:31 1-5.

CHATTANOOGA HOLDS MEET

Chattanooga, Tenn., May 8—The postponed track meet of the Lookout Mountain Automobile Club was held over the ½-mile track here today. The dust was thick, but no accidents occurred. Summaries:

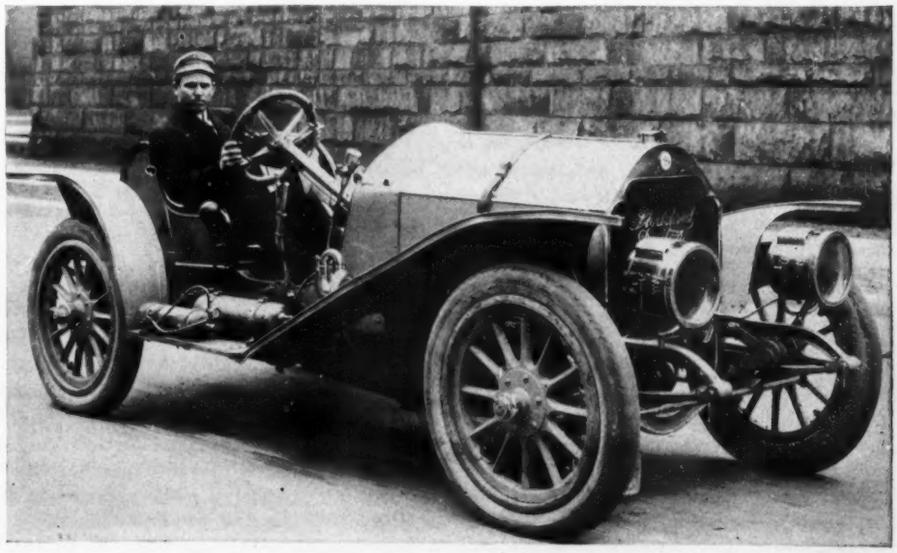
One mile, free-for-all—Strang, Buick, won; De Witt, Buick, second; James, Thomas, third; Burke, Oldsmobile, fourth; time, 1:20.

Five miles, stock cars, $1,500 and under—De Witt, Buick, won; Duffy, Chalmers-Detroit, second; Dickson, Mitchell, third; time, 7:00.

Five miles, free-for-all stock cars—Strang, Buick, won; Duffy, Thomas, second; De Witt, Buick, third; time, 6:50.

Five miles, Tennessee championship—Duffy, Thomas, won; James, Chalmers-Detroit, second; Burke, Oldsmobile, third; time, 7:05.

Ten miles, Chattanooga derby, free-for-all—G. De Witt, Buick, won; time, 14:46 2-5.



ENGLEBECK IN STODDARD-DAYTON, COBE CUP NOMINEE

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Necessity of Good Mud Pans and Aprons Apparent

ATTENTION was drawn in these columns last week to the proper equipment of mud-preventatives on motor cars for city uses as well as for rural work. Since then the 4-day Harrisburg reliability run, with 1 day a continuous mud-plug through clay and grime, has served to impress on makers the added necessity of the best devices for keeping mud off the motor and transmission parts, as well as off the body of cars. It is peculiar that some concerns which have devoted every energy to keeping mud out of the bonnets and away from the motor have utterly failed in keeping mud off the sides of the car body. It is essential to keep mud off the motor in order that it will run properly without danger of heating or short-circuiting, and it is also important that as much mud as possible be kept off the body of the car, because when the fender and mud-apron design is such as to allow mud striking the side of the body and on the dash it is practically a safe conclusion to make that such fenders and mud aprons will not stop the mud from getting on the clothes and faces of the occupants of the cars. An adequate fender and mud-apron system must play the dual role of protecting the machinery of the chassis and also the car body and the passengers.

THE mud that splashes through the radiator onto the motor does a two-fold injury, as demonstrated in the run already referred to. Before getting through the radiator to the motor it is almost certain to clog the radiator, and as actually happened in a couple of cases, this clogging of the radiator so interfered with the cooling of the motor that it was necessary to stop and clean the mud out of the radiator before the motor would show its rated deficiency. In a reliability run this means penalties, and in any tour it means the loss of time. In air-cooled machines it is imperative that mud be kept away from the cooling flanges on the engine, and it is certain that the ordinary screen across the front of the bonnet will fail to do this. One maker has fitted excellent mud shields inside of the frame members in front of the bonnet screen, and so efficient did these prove in the run that not a particle of mud reached the engine in spite of the fact that on the muddy roads this car actually made the fastest time in that it suffered the smallest time penalty.

BUT the needless accumulation of mud around the motor has another bad effect in addition to interfering with the normal cooling of the motor: Nobody enjoys dirt, and when a motor after a day's run in the mud is so coated that a good half-day will be necessary to get all of the mud out it means additional expense, because cleaning mud from around a power plant takes time and money. When mud gets in around the magneto and carbureter there is grave danger of trouble. A good preventative of practically all of this motor mud-trouble is to place some form of mud apron in front of the radiator. Several makers already fit a piece of waterproof cloth, but while it serves the purpose admirably it generally detracts from the car's graceful and cleancut appearance.

BUT with the motor protected the mud apron should extend sufficiently to the rear to care for the transmission and universal joints. To see a motor ideally protected and to find back of the flywheel the mud apron filled with clay so that the flywheel revolves in a little cage with mud all around is disappointing. It is equally so to find the gearbox so coated with mud that the wing nuts holding the cover plate in place are entirely obscured. It happens that the most mud around the clutch and gearbox is where the under apron is shortest, ending close back of the flywheel. Mud around the gearbox does not interfere much with the operation of the car, providing all of the mechanism connected with the gear-shifting system are enclosed, but where they are not the mud gets around the ball-and-socket joints and makes gear-shifting a harder task than it should be. With cone clutches better mud apron constructions are needed than with disk clutches, where all of the parts are enclosed and operate in oil. Mud ordinarily should not interfere with the operation of universal joints in the propeller shaft or between the clutch and transmission set, but in the Harrisburg run two cases were recorded where the load of mud carried by the leather coverings undoubtedly assisted in loosening the leather boots, which by the end of the run were not offering that mud and water protection to the joint which they were expected to.

BUT the body protection against mud must not be neglected, as it actually is in several cases. This does not mean that fender and mud shield constructions can be carried sufficiently far so that mud cannot get on the body of a car in an all-day mud run—far from it: rather there should be on all touring cars mud pans between the running board and the car frame, because where these are not present the front wheels throw mud not only against the tonneau sides, but against the dash and actually on the front seat passengers. Mud thrown on the sides of the tonneau, when it could be avoided, means quicker destruction of the body paint, more frequent washing and less pleasure to the passengers.

THE accessibility of motor parts through the mud apron is a most considerable factor in any car. Where the under pan or mud apron is one continuous piece secured to the side members of the frame by a series of bolts it is a task to secure any tool or part that by accident might drop from the workman's hand into the mud apron. To secure it means employing a long stick or wire and perhaps getting under the car. With a large hinged door at either side, or with the mud apron hinged, the lost part can be found and the apron replaced in less than half a minute and without any inconvenience. In certain motors the casting of integral webs between the motor arms practically eliminates the necessity of any such mud apron construction and in one or two make of cars has eliminated entirely the mud apron underneath the motor. In certain cars, where the carbureter is placed very low and beneath the subframe members, a small door is essential in order to reach the carbureter at all, and where such are used they should be securely hinged and locked.

UP to the present little attention has been devoted by any manufacturer towards the protection of the rear wheel brakes from mud or the protection of the service brake in rear of the gearbox. One foreign car has cast integrally with the back of the gearbox cover a scoop-like extension, which actually serves as a mud apron to the service brake and proves particularly efficacious. This could be imitated to advantage or other designs used. Frequently rear wheel brakes become mud coated, and if not frequently applied the mud gets between the external set and the drum, resulting in scratching of the drum when the brakes are applied. The fitting of some simple form of shield is advisable.

THIS YEAR'S TARGA FLORIO WON BY A BARON

PALERMO, SICILY, May 2—Just a mere minute, 60 short seconds, made it possible for two new names to be added to the list of winners of the Targa Florio road race. Baron Ciuppa, driving the first of the two S. P. A. cars that started, finished 1 minute ahead of Chevalier Florio, who drove a Fiat. Ciuppa's time was 2 hours 43 minutes 19 seconds for the 93-mile course, the average per hour being 34.2 miles.

Keen excitement attended the fourth running of the Targa Florio. It was not because of the French cars—two Berliet and four de Dion-Boutons. They were considered dangerous, but the interest centered almost solely upon the founder of the event, Chevalier Florio, who for the first time since the running of his race decided to try to win it. Florio was the first to start—at 8:40 in the morning—and the ten other contestants were sent away at intervals of 10 minutes. Florio was the first man back and he was received with vociferous cheers and the crowd acted as if the race already was over and the official announcement made. It thought Florio was the winner.

Ciuppa was the second contestant to finish and as he passed the finishing place he was not received with the wild cheering and enthusiasm that marked the chevaliers arrival. When finally the official announcement was made that the baron and the S. P. A. car had won the race from the chevalier and his Fiat by an even 1 minute, there really was no enthusiasm at all.

The only Lancia car that started, with Airoldi at the wheel, came in third, preceding the second S. P. A. by more than 25 minutes. Fifth was the Itala driven by Peseta, and then came the four French cars which finished of the six that started —two de Dion-Boutons, a Berliet and another de Dion, respectively.

All the cars were of the every-day touring car type. With the exception of the second S. P. A. and three de Dion-Bouton cars, all had four-cylinder motors, the three French cars had two-cylinder engines and the second S. P. A. a six-cylinder motor. The bore of the various cars varied. The winning S. P. A.'s bore was 130 millimeters—5.1 inches. The bore of the Fiat was 4.9 inches, that of the Lancia 3.5 inches, which also was the bore of the fourth car, the six-cylinder S. P. A. The bore of the Itala was 5.1 inches, that of the four-cylinder de Dion-Bouton, which finished sixth, 3 inches, while the bore of the two two-cylinder de Dion-Boutons was 3.1 inches and that of the Berliet 4.7 inches.

The race was run over the same circuit as last year, but with the difference that the distance was just one lap, or once around the circuit, or 93 miles. When it is considered that there are close to 1,500 turns on this course—some so abrupt that they offer real danger—it will be seen that it was by no means an easy round. The roads were in fair condition.

TARGA FLORIO RESULTS

Car and Driver	Time
1—S. P. A., Ciuppa	2:43:19
2—Fiat, Florio	2:44:19

First European Race

Palermo, Sicily, April 29—With the running of the coupe des voiturettes, on the circuit de Palermo today, the European racing season was inaugurated. This curtain raiser was really a tame affair and entirely one-sided. Last year it was a French race on Italian soil, but there were at least three different makes of cars and the battle was a fine one, while this year there was hardly no fight at all between the three Lion-Peugeots and the three de Dion-Bouton cars. The latter never had a show in the 187.5-mile race. The little one-cylinder Lion-Peugeot, driven by Goux, won handily in 6 hours 48 minutes 2 seconds, thus averaging a fraction less than 28 miles an hour. This is below last year's average by over half a mile. Possibly it would have been the reverse had not the fuel supply of Giuppone, who also drove a Lion, ran out about 6 miles from the finish. Giuppone, who won the race last year, was second, ahead of a de Dion-Bouton, driven by Olsen. In 1907 the race was also won by a French car, a Sizaire-Naudin.

Coming Motor Events

Reliability sealed bonnet contest, Washington, D. C., Washington Automobile Club, May 15.

Second annual endurance run, Norristown Automobile Club, to Hagerstown, Md., May 18-19.

Kenwood hill-climb, Albany, N. Y., Albany Automobile Club, May 22.

Two-hundred-mile endurance run, Hartford Automobile Club, Hartford, Conn., May 22.

Third annual endurance contest, New Jersey Automobile and Motor Club, May 22.

Annual hill-climb, Giants' Despair mountain, Wilkesbarre Automobile Club, May 31.

Annual hill-climb of Cleveland Automobile Club, Cleveland, O., on Gates Mills hill, May 31.

Annual hill-climb of the Bridgeport Automobile Club, Bridgeport, Conn., on Sport Hill, town of Easton, May 31.

Endurance run, Philadelphia to Pittsburg and return, Quaker City Motor Club, June 14-18.

Track meet of Bay State A. A., Boston, June 17.

Stock chassis race for Cobe trophy and light car race, Chicago Automobile Club, June 18-19.

Fifth annual tour, Bretton Woods, Portsmouth, Boston, Albany Automobile Club of Albany, N. Y., June 22-28.

Track race meet, Point Breeze, N. J., Quaker City Motor Club, June 25-26.

Straightaway races, Motor Club of Wildwood, Wildwood, N. J., July 3-4.

Southern California Automobile Dealers' Association, road races, July 4.

PARIS, May 2—England and France have got together for a friendly confab on the knotty show question, with the result that there is a possibility of the problem being settled by the inauguration of simultaneous shows every 2 years in London and Paris. The meeting, which was of a purely unofficial character, was held in Paris at the residence of M. Delaunay-Belleville. The British trade was well represented with delegates from Daimler, Milnes-Daimler, Armstrong-Whitworth, Lanchester and Dietrich factories, and the president and secretary of the Motor Manufacturers and Traders' Association. A small group of constructors, the leaders of which spoke for Panhard, Peugeot, Delaunay-Belleville and Dunlop, were present in the name of the French industry, or more correctly for that section which is opposed to an annual show in Paris. The points on which there was agreement were that England should hold its show this year as previously announced, arrangements which had been made some time ago preventing an abandonment now. In 1910 there should be a show in both London and Paris, but in 1911 no show should be held in either city, this rule of simultaneous shows on alternate years to be continued henceforth. Among the minor matters was an agreement that foreigners showing at the Paris salon should be accorded the same treatment as the home firms, which would necessarily abolish the system of drawing lots among a select number of old-established French firms for the best and most central positions. If a show were held in Paris this year despite the efforts of the constructors to prevent it, British firms should refuse to take any part in it. This withdrawal, however, would not cause any loss, for England has never averaged more than two firms at the annual Paris motor exhibitions. Although the agreements were in no way official or binding, they have their importance in the fact that they will show to the French trade a practical means of bringing to an end the present internal strife. If it shows that England is willing to forego an Olympia show every other year, the principal argument holding the French salon annually as before will have been removed.

National Orphans' Week

New York, May 10—The executive committee of the American Automobile Association has decided that the first week in June shall be known as national orphans' week, and the secretaries of the affiliated organizations will be requested to observe the recommendation of the national body. It is expected that the customary parades and outings for orphans will be arranged on even a larger scale than ever before. This time a week instead of a day is set aside in order that the cities may select a suitable day.

GLIDDEN PATHFINDER ARRIVES IN DENVER

DENVER, COLO., May 12—Special telegram—Dai Lewis, in the Glidden pathfinder E-M-F car, arrived here at 2 o'clock this afternoon and was given a royal welcome, 100 cars meeting him and escorting him into the city, preceded by a brass band. This marks the turning point of the Glidden tour, the route bending from here to Kansas City, Mo., where the contest will end. Denver will be at the end of the eleventh day of the Glidden tour and the odometers should show 1,897.8 miles at this point, which means an average of 172.5 miles per day, the highest average in the history of the classic. The last 3 days to this point—Omaha to Kearney, Kearney to Julesburg and Julesburg to Denver—are each a double century, the first time the Glidden contestants have beeen asked to put 200 miles into a day. This in itself is a fitting answer to the question as to the suitability of western roads for Glidden purposes.

The seventh day's trip of the Glidden next summer will be from Mankato, Minn., to Fort Dodge, Ia., 143 miles, and will afford a mixture of good and bad roads. One thing which will make things much easier for the tourists, however, is the great interest being taken by the motorists of that section, who have succeeded in getting the farmers along the line to promise much in the way of road work in honor of the tour. Through Winnebago, Blue Earth, Algona, Humboldt to Fort Dodge, the roads are of gumbo and of necessity need lots of attention. The interest of the farmers is shown, however, by the fact that previous to the arrival of the pathfinding car, the residents had left their fields and had dragged the roads for nearly half the distance. The principal gumbo stretches were in the vicinity of Elmore and Blue Earth, and while soft at this time later will be put in first-class condition. This section is one of the richest farming districts in the two states of Minnesota and Iowa and the scenery will be very attractive in July when the fields are at their best.

PATHFINDER AND ESCORT GOING INTO MANKATO

GLIDDEN TOUR ITINERARY

	Miles
First Day, to Kalamazoo, Mich	142.2
Second Day, to Chicago	173.2
Third Day, to Madison, Wis	175
Fourth Day, to La Crosse, Wis	154.4
Fifth Day, to Minneapolis	178

SAMPLE OF WESTERN ROADS

The roads improve from Algona to Fort Dodge and on to Jefferson and the pathfinding car covered this distance, some 95 miles in 1 day with ease.

On Thursday morning when the party started from Algona, the road had begun to harden and when Fort Dodge was reached at noon the going was fairly good.

TOWN OF GLIDDEN, ON GLIDDEN ROUTE

HAVING MAPPED OUT 11 DAYS OF THE ROUTE

PATHFINDERS IN MINNEAPOLIS STATE PARK

	Miles
Sixth Day, to Mankato, Minn	132
Seventh Day, to Fort Dodge, Ia	143
Eighth Day, to Omaha, Neb	186
Ninth Day, to Kearney, Neb	200
Tenth Day, to Julesburg, Colo	206
Eleventh Day, to Denver	208

The run that day was to Jefferson, a distance of 90 miles, which seemed truly remarkable to the occupants of the car, who had become accustomed to pulling through a dozen or so miles of mud every day.

At Woodbine, 40 miles north of Omaha, ten cars of the Council Bluffs Automobile Club formed the third escorting party of the day. These enthusiasts were in friendly rivalry with the larger city of Omaha, just across the river, and they literally captured and took possession of the pathfinding party. The run was completed into Omaha at 7 o'clock, and after the two cars were stored for the night the party was taken back to Council Bluffs for dinner.

The scenery on this day's run was a little more diversified than usual, the rugged bluffs near the river offering a pleasant contrast to the northern country passed through the early part of the week. The roads were thoroughly dried and in some places had been dragged, so that the day's journey was somewhat in the nature of a pleasure tour. The day's mileage was 136 miles. The run for the eighth day of the Glidden tour will be from Fort Dodge to Omaha, a distance of 136 miles. In the opinion of Secretary Dai H. Lewis, the Gliddenites will have no difficulty in making this day's run.

The intention now is to have the train of Pullmans start from Fort Dodge and accompany the tourists next July to Denver and then back to Kansas City. The contestants may sleep in the Pullmans or at hotels as they elect.

On the ninth day of the Glidden tour the run will be from Omaha to Kearney. This run will be about 200 miles. The pathfinder got only to Central City Saturday night, as the start was not made from Omaha until nearly 10 o'clock. The first

CROSSING PLATTE RIVER

CROSSING FIELDS AFTER MAY SNOW STORM

13 miles out of Omaha the road is macadam and brick pavement, and from there on to Fremont it is gravel and dirt and is in excellent condition. There is perhaps ½ mile of sand soon after leavng Fremont, but this will give no serious trouble.

The important towns through which the tour will pass on the ninth day are Elkhorn, Waterloo, Valley, Fremont, Ames, North Bend, Rogers, Schuyler, Benton, Columbus, Duncan, Silver Creek, Central City, Grand Island, Shelton and Kearney. The Platte river begins to make itself prominent here.

COMMITTEE REPORTS ON NON-MOTOR STOP CAR

BOSTON, MASS., May 8—Charles F. Park, Charles J. Bailey, Virgil A. Charles and James Fortesque, the technical committee appointed to examine the condition of the Maxwell four-cylinder touring car which recently established a record of 10,074 miles in a non-motor stop run, yesterday filed their formal report, which was highly pleasing to the Maxwell company. Summed up, the committee declared that the car had stood the test in a remarkable manner. The car when delivered to the committee was in practically good general running condition. The amount of wear in the engine was very slight or inappreciable except in the exhaust valve gear. The main journals and connecting rod bearings were in exceptionally good condition. The pistons, piston rings and cylinders were smooth and apparently tight. Not a single bearing or moving part was scored or cut. The exhaust valves were not properly timing. The inlet valves were operating satisfactorily. Bolts and fastenings were properly holding. The amount of carbon in the cylinders was not excessive. The machine was extremely dirty.

The full report is as follows:

The car was turned over to the committee at Copley square, Boston, April 12 at about 4:25 p. m. A ride of about 10 miles was taken to observe the general running of the machine. The route selected was Commonwealth avenue to Summit avenue, to Beacon street, and return. This route included the climb over the noted Corey hill in both directions. The live load in the car consisted of the four members of the committee and the driver. The performance of the machine on this run was satisfactory, although at no time was the car speeded. The last portion of the Commonwealth avenue grade was taken on the intermediate gear. In this gear the car was turned into Summit avenue and run about two-thirds of the distance up the back side of Corey hill when the gear was shifted to the low, on which gear the climb was finished. Proceeding down the grade on the front side of the hill the car was stopped to test the brakes. At the foot of this grade the car was turned about on Beacon street; and the climb over the hill from the front side was made on the low gear. At the top of the hill the cap was removed from the radiator and the water was found to be not boiling. About half-way up this ascent the car was brought to a standstill and again started. Going down the back side of the hill the car was stopped on the steepest grade and reversed. After backing for some distance the gear was shifted and the return run made to the Massachusetts Institute of Technology, where the committee made the examination of the power plant.

For all of the stops that were made the brakes held the car, and the clutch did not slip in making the starts. One set of brakes only was used—the external contracting, the internal expanding set—emergency—having been disconnected. The engine ran smoothly and knocked only when hard worked. The exhaust was regular and there was no skipping. The committee pronounced the car in apparently good general running condition.

All the parts were found in proper position and properly connected with the exception of the emergency internal expanding brakes. The shoes for these brakes had been removed from the wheel drums and the rods connecting with the operating lever and clutch were disengaged. There were no split washers under the cap screws for the guide of No. 1 exhaust valve push-rod, and one of the bolt flanges on the casing of the first universal joint was broken off and the bolt gone. No cotter-pins were missing and all bolts and nuts were set up hard with the exception of one cap-screw on the water manifold which was loose, the four lower cap-screws of the exhaust manifold which were slack, and one slack nut on the inlet manifold. All other fastenings were properly holding. The radiator was tight, as were also the water connections. The whole car was extremely dirty. Sand, mud, oil and grease were literally plastered to some of the parts and a mixture of these ingredients was spread over the engine and all the machinery. The magneto had no protecting covering.

THE ENGINE

The power unit—engine, clutch and transmission—was removed from the car and completely taken apart. It was the intention of the committee to measure all lost motion or wear in the main and important bearings before the boxes were opened; but as these bearings showed no appreciable wear the plan was abandoned, and the difference in diameters of the shafts or pins and their boxes will be given.

Main Crankshaft Bearings—Difference in diameter of shaft and boxes: No. 1, 0.0055 inches; No. 2, 0.0055 inches; No. 3, 0.0052 inches; No. 4, 0.0053 inches; No. 5, 0.0025 inches. The cap of box No. 1 was not down to the bearing on the inner end.

Connecting Rods, difference in diameter of boxes and pins—Crank-pin end No. 1, 0.0030 inches; No. 2, 0.0025 inches; No. 3, 0.0010 inches; No. 4, 0.0020 inches. The fit on crank-pin No. 3 was so snug that the connecting rod would stand a number of degrees out of plumb without falling over. Wrist-pin end, No. 1, 0.0030 inches; No. 2, 0.0015 inches; No. 3, 0.0025 inches; No. 4, 0.0025 inches. We can call the crank pins round, as they gave practically the same micrometer readings in all directions. The same may be said of the wrist-pins.

Pistons — The pistons were clean and smooth. All the rings in each were bright and were bearing entirely around their full circumference. All wrist-pins were firmly held in the pistons. The tops of the pistons were coated with carbon.

Cylinders—The cylinder bores were bright and smooth. The inlet valve seats were smooth and clean and showed a bearing seat entirely around. The exhaust valve seats were dirty and spotted. Carbon was deposited on the heads and in the passages.

Camshafts, difference in diameters of shaft and bearings—Inlet side, No. 1, 0.005 inches; No. 2, 0.004 inches; No. 3, 0.003 inches; No. 4, 0.003 inches; No. 5, 0.002 inches. Exhaust side, No. 1, 0.016 inches; No. 2, 0.007 inches; No. 3, 0.004 inches; No. 4, 0.004 inches; No. 5, 0.003 inches. The outer end of bearing No. 1 on the exhaust side was unprotected. The diameter of the bearing portions of the shafts was the same as the remaining portions except for the unprotected end of the exhaust camshaft, which was 0.002 inch smaller. The cams were nearly of the same size in the throw dimension. On the inlet side this dimension varied 0.003 inch, while on the exhaust side the variation was 0.004 inch. The wearing on the gear teeth was barely noticeable. The composition idle gear connecting with the magneto gear showed some wear. These gears were not encased and considerable dirt and grease mixed together was packed under the shield for these gears.

Push Rods and Guides, difference in diameter of push rods and bore of guides—Inlet side, No. 1, 0.003 inches; No. 2, 0.001 inches; No. 3, 0.002 inches; No. 4, 0.005 inches. Exhaust side, No. 1, 0.015 to 0.023 inches; No. 2, 0.003 inches; No. 3, 0.002 inches; No. 4, 0.002 inches. The push rod for No. 1 exhaust valve was 0.011 inch smaller in diameter than all the others, which were practically of the same size; and the bore in the guide for this push rod was out of round. The bottom ends of the push rods showed scarcely any wear except No. 1 on the exhaust side, which was slightly worn. The top ends showed some wear. No. 4 of both inlet and exhaust sides was the most worn. The guide pins and slots in the guides showed some wear. The bore in the guides was about 0.01 inch larger at the top end than the portion below the slots for the guide pins. The length of the push rods varied about 0.007 inch, and those on the exhaust side were about 0.01 inch shorter than those on the inlet side. The push rods were round and showed no wear on their sliding surfaces.

Valves—All valve stems were smooth and in no case cut. The seats of the inlet valves were bright and in good condition. The seats of the exhaust valves were worn and badly pitted. There was a heavy deposit of carbon on the exposed portion of the stems of the exhaust valves and on the under side of the heads. The lower side of the inlet valves was clean, but there was considerable carbon on the top of the heads. The bottom of the stems of the inlet valves was very slightly worn. The bottom end of the exhaust valves showed wear and the ends were upset somewhat, No. 4 being the worst. The valve stems showed some wear, and more at the ends of the sliding surface than in the middle. The average diameter was about 0.001 inch smaller than the portion beyond the bearing surface.

Difference of diameters of valve stems and bore in valve guides—Inlet valves, No. 1, 0.008 inches; No. 2, 0.008 inches; No. 3, 0.008 inches; No. 4, 0.011 inches. Exhaust valves, No. 1, 0.010 inches; No. 2, 0.008 inches; No. 3, 0.007 inches; No. 4, 0.014 inches. The bore in the valve guides was on an average from .007 inch to .008 inch larger at the bottom end than at the top. One spring retaining key and collar was somewhat worn, the key being worn where it had sunken into the collar.

Timing of valves, amount of play between bottom of valve stems and top of push rods—Inlet valves, No. 1, 0.013 inches; No. 2, 0.007 inches; No. 3, 0.016 inches; No. 4, 0.011 inches. Exhaust valves, No. 1, 0.108 inches; No. 2, 0.030 inches; No. 3, 0.020 inches; No. 4, 0.028 inches. With a sheet brass step which had been placed under exhaust valve No. 1, the play was .073 inch. According to the maker's marks on the fly wheel the valves were operating as follows: Inlet opens—No. 1 on time; No. 2, on time; No. 3, on time; No. 4, 2° too late. Inlet closes—No. 1, 2° too early; No. 2, 2° too late; No. 3, 3° too late; No. 4, on time. Exhaust opens—No. 1, 45° too late; No. 2, 23° too late; No. 3, 13° too late; No. 4, on time. Exhaust closes, No. 1, 35° too early; No. 2, 17° too early; No. 3, 5° too early; No. 4, 12° too early.

With the brass step under exhaust valve No. 1 the opening was 27° too late and the closing 19° too early. The lift was practically the same for all the valves except exhaust No. 1.

Spark plugs—Six of the eight spark plugs

WIRELESS TELEPHONE TESTED ON MOTOR CAR

were fairly clean. One pair was somewhat foul.

Oil—The oil in the crankcase was clean and clear.

Carbon—The carbon deposit was scraped from the tops of the pistons and from the cylinder castings and weighed; the amount of carbon in any cylinder was less than an ounce, as follows: Top of piston, No. 1, 1¾ drams; No. 2, 5¼ drams; No. 3, 3 drams; No. 4, 3 drams. In cylinder casting, No. 1, 3½ drams; No. 2, 8¾ drams; No. 3, 4¾ drams; No. 5, 9½ drams.

INDEPENDENTS MAKE PRESENTS

New York, May 8—As a token of their appreciation of the work accomplished by James Couzens and Benjamin Briscoe as chairmen of the American Motor Car Manufacturers' Association during the past 4 years, the members at the Chicago meeting voted them a suitable souvenir, the presentation of which took place at a luncheon at the Café des Beaux Art Wednesday. Job E. Hedges, counsel of the association, acted as toastmaster and after a brief resumé of the work of the two chairmen that has aided so materially in the association attaining its present enviable position in the industry, presented Mr. Couzens with a watch and charm, and Mr. Briscoe with a bronze figure of "The Guardian of the Secret," by Saint Marceaux, a reproduction of the original marble statue in the National Museum of the Luxembourg in Paris. The members of the show committee, H. O. Smith, chairman, S. H. Mora and R. M. Owen, for their management of the successful show in Grand Central palace last January, were remembered with suitably engraved watch charms.

James Couzens, who is secretary-treasurer and general manager of the Ford Motor Co., was the first chairman of the association and served for 2 years, while Benjamin Briscoe served a similar term, ending in February. There was a toast to Henry Ford, who was unable to attend the gathering, and general felicitations for the members of the committee of management. All those present had something to say regarding the industry in general and the A. M. C. M. A. in particular.

At the luncheon were: H. O. Smith, chairman, C. G. Stoddard, James Couzens, S. H. Mora, Walter C. Marmon, W. H. VanDerVoort, G. Vernor Rogers, A. C. Newby, W. G. Morse, R. E. Olds, Benjamin Briscoe, Charles E. Duryea, L. M. Bradley and Alfred Reeves.

At a meeting of the committee of management in the morning there was considerable routine business transacted, together with a discussion of shows and of the trade generally, the reports of which indicated a most prosperous condition with every indication that 1909 would be a banner year in the motor car trade.

The matter of good roads received considerable attention, while that of contests resulted in a resolution being passed in the form of a recommendation to the Manufacturers' Contest Association, to the effect that an effort be made to have the country divided into sections in each of

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which there should be one leading contest on a nonconflicting date to enable the manufacturers to arrange some kind of a circuit that will include the main sections and prominent cities of the country. It was the general opinion that while the manufacturers desire to encourage properly conducted contests by entering cars, such contests should be at dates and in such localities as to permit the maker to participate at a minimum amount of travel. Moreover, it was agreed that through the M. C. A., contests should be encouraged only where there is every assurance of the affair being conducted by experienced men, thereby lessening the chance of controversies as to rules and management.

WIRELESS TELEPHONE TESTED

New York, May 10—The wireless telephone is the latest equipment of the modern motor car, a recent demonstration of the utility of the Collins device showing that it can be adapted to motoring. This test was made by A. Frederick Collins, of the Collins Wireless Telephone Co., and A. T. Murray, of the Lozier Motor Co., who talked across Weequahin lake in New Jersey from a Lozier car on one side to a point directly opposite. After this test communication was established with the Lozier building in New York and again the telephone worked. Inventor Collins intends perfecting a machine that can be attached to a motor car and used for calling up a near-by garage in case of trouble. The instrument used in the test consisted of an ordinary transmitter and receiver, while the receiving and sending instruments were of the same character as are used in the ordinary wireless telegraph instrument, consisting of induction coil, etc. It may be tuned to communicate with any desired instrument as in the case of the wireless telegraph. The whole instrument complete may be carried in a good-sized suitcase, the batteries being very powerful. In the Lozier trial twenty-five ordinary dry cells for short distance were used, while high-voltage storage batteries were employed for the long distance test. In establishing communication two metallic stakes were driven into the ground.

DEATH OF D. W. MARMON

Indianapolis, Ind., May 10—Following a year's illness, Daniel W. Marmon, president and one of the founders of the Nordyke & Marmon Co., died at his home in this city at 1 o'clock this afternoon from arterio sclerosis. He had been confined to his home for the last 7 months. Mr. Marmon was born in Ohio, moving with his parents to Richmond in 1846, when he was 2 years old. He was educated in the public schools of that city and in Earlham college, beginning his business career in 1866 when he became a member of the firm of E. and A. H. Nordyke, manufacturers of flour milling machinery. The company was reorganized and incorporated as the Nordyke & Marmon Co., and in 1876 was moved to Indianapolis. Several years ago the company added the manufacture of the Marmon motor car, which it has since continued. Mr. Marmon was also president of the Indianapolis Light & Heat Co. and a member of the Commercial and Columbia clubs. A widow and three children survive.

PERCY MEGARGEL DEAD

New York, May 8—Percy F. Megargel, of New York, famed as a pioneer in American transcontinental touring, died of cancer, last Sunday, after a month's illness. He was 34 years old and is survived by his widow and infant daughter. Interment was at his boyhood home in Scranton, Pa. Among Mr. Megargel's strenuous accomplishments in motoring was his double transcontinental trip made in the Reo Mountaineer in the fall and winter of 1905-6. Leaving New York August 19, 1905, accompanied by David F. Fassett, he drove his car, equipped as a traveling camp, across the northern part of the continent to Portland, Ore. From thence, in midwinter, he went to San Francisco, through Los Angeles, across the snowbound regions of the Rocky mountains in Arizona and New Mexico with mercury frequently 40 degrees below zero. He and Fassett were lost for days in the snows of the Rockies and in the sands of the desert, and once saw their car disappear in the quicksands of a river. Three weeks later, melting snows sent down a flood that washed out the quicksand and revealed the machine. Mr. Megargel recently wrote a charming book, "The Car and the Lady," covering some of his experiences in strenuous motoring.

New York Economy Test

FIAT TAXICAB

NEW YORK, May 10—There have been a number of so-called economy or efficiency tests, but it remained for the New York Automobile Trade Association to hold one that was really worth while and get results that will be a benefit to motorists for all time. The contest held was scheduled to wind up the carnival week, but as the weather man did not favor, it had to be postponed. As held on Friday of last week, the weather was ideal and doubtless had much to do with the fine results obtained.

The trouble with some of the former contests of this nature has been a fundamental one, in that the winning was made a matter of distance solely. Now anyone could figure out that a very light car would travel farther than a very heavy one and on the same fuel. So these contests only proved something that was well-known. In the contest of last week the winner was decided on a ton-mile basis. That is, the award was based upon the distance traveled by the car, multiplied by its total weight.

Real Economy Shown

In this way real economy was necessary, for a light car might travel a great distance and not stand a show with a heavy car traveling a much smaller number of miles. In fact, the real factor was the weight and not the mileage, for in the process of multiplication the larger and consequently the influencing factor, was the large weight and not the small distance.

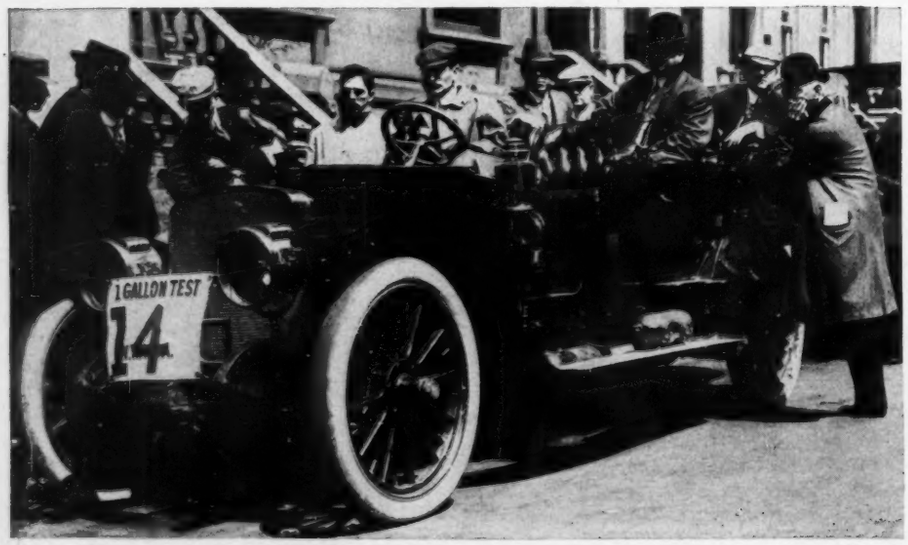
Weight alone could not win, of course, but the combination of weight with a natural traveling ability, or innate economy, was the winning one. That this fact was appreciated was shown by the statistics which pertained to the winner. This turned out to be a Franklin four-cylinder car of 18 horsepower. The air-cooler's score did not run along lines of wonderful distances, its mileage being exceeded by the Cadillac single-cylinder of 10 horsepower, the Brush entry, and one of the two-cylinder Buicks. Where the Syracuse car made up was in the weight which it carried, its percentage of live load to total being the largest in the contest. Winners in the various classes were:

CLASS A, PRICE UNDER $850

	Mileage	Official score, round miles	Ton miles
9—Cadillac	42.6	99,045	49.52
22—Brush	40.6	55,622	27.81
21—Brush	20.9	29,678	14.84
CLASS B, PRICE $851 TO $1,250			
5—Buick	41.1	86,574	43.29
2—Overland	24.95	64.434	32.22
6—Buick	18.5	56,835	28.44
CLASS C, PRICE $1,251 TO $2,000			
1—Franklin	35.8	103,104	51.55
19—Chalmers-Detroit	25.7	78,300	39.15
7—Chalmers-Detroit	21.0	67,305	33.65
8—Cadillac	21.55	67,128	33.56
11—Kisselkar	13.3	43,757	21.88
CLASS D, PRICE $2,001 TO $3,000			
3—Overland	16.0	53,500	26.75
CLASS E, PRICE $3,001 TO $4,000			
25—Fiat	25.9	84,434	42.22
24—Lancia	23.9	76,958	38.48
CLASS F, PRICE $4,000 AND OVER			
14—Lozier	17.2	89,433	44.72
12—Matheson	15.5	86,800	43.40
17—Renault	13.3	56,059	28.03
CLASS G, TAXICABS			
33—Thomas	22.7	76,839	38.42
15—De Dion	18.0	55,620	27.81
16—De Dion	17.8	54,290	27.15

There were about forty entries made or promised, but just twenty cars showed up and started. Many of them appeared at

FRANKLIN, WINNER OF ITS CLASS AND OF THE TEST



LOZIER SIX-CYLINDER, FIRST IN ITS CLASS

TABULATION OF RESULTS OF THE

Car No.	MAKE	BODY TYPE	H. P. A. L. A. M.
1	Franklin	Touring	18
9	Cadillac	Runabout	10
14	Lozier	Touring	51
12	Matheson	Touring	40
5	Buick	Touring	22
25	Fiat	Taxicab	16
19	Chalmers-Detroit	Touring	24
24	Lancia	Touring	19
33	Thomas	Taxicab	18
7	Chalmers-Detroit	Touring	24
8	Cadillac	Touring	25
2	Overland	Touring	25
17	Renault	Taxicab	22
16	De Dion	Taxicab	14
15	De Dion	Taxicab	14
6	Buick	Touring	16
22	Brush	Runabout	7
3	Overland	Touring	38
11	Kisselkar	Touring	29
21	Brush	Runabout	7

Total number of cars started, 20; total gasoline. gers, 62,800; average pounds per horse power of cars, weight of cars loaded, 3,140; average time over trip. power; average power per car, 22.15 horse power; aver engers, 159.3 pounds. Cost with gasoline at 15 cents

Returns Franklin Winner

the starting line long after the contest was scheduled to begin, and, consequently, it was necessary to make the technical examination at a time when they were scheduled to be on the road. After the twenty were examined by the zealous and efficient committee of technical experts, each machine was run onto the scales of the A. C. A. on West Fifty-fourth street, where the contest was started.

Late in Starting

They were then weighed, both with and without their complement of passengers, after which the final examination was made of the gasoline system previous to furnishing them with the measured and sealed 1-gallon can of fuel. It took about an hour after the contest was slated to begin before Starter Fred Wagner was able to send away the first of the machines, which happened to be not only No. 1 entrant, and No. 1 starter, but turned out to be No. 1 finisher, too. After that, the cars were sent away at regular intervals of 6 minutes each.

Although the six-cylinder engine is usually considered to be a fuel-eater, two makers showed the courage of their convictions and started sixes. One of these, the bi six Lozier, carrying the second heaviest load of the day, made an excellent showing and won second in the contest as a whole, and first in its class.

The cars were divided into classes according to the lately adopted price and power classification. Not only were all classes represented, but there was in addition a specially-made class for taxicabs, regardless of power or price. The latter furnished one of the best contests of the day, having three starters, all of them foreign makes. One of these, the Fiat, driven by the redoubtable racing driver, de Palma, after a miserable start, in which he stalled his engine, made a very noteworthy score.

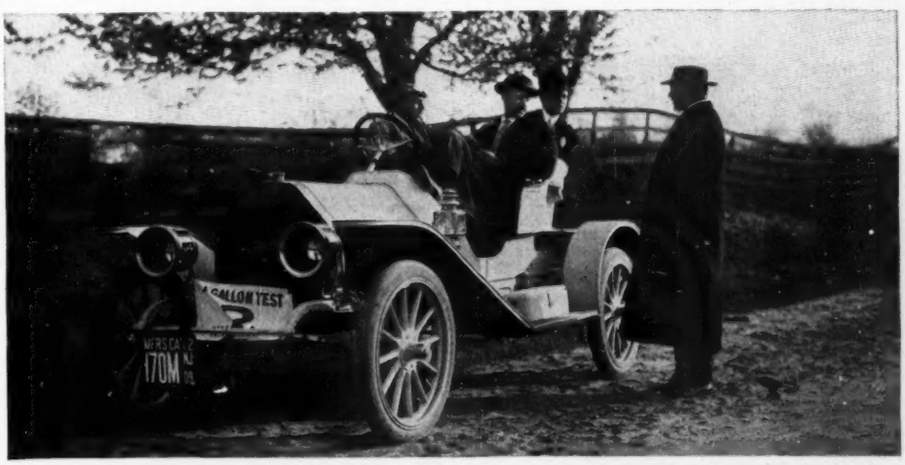
The result of the contest was to show people how cheaply a motor car could be driven a comparatively long distance. In this way, the obtained figures were a great surprise to many, particularly in the medium-priced class, carrying the usual number of five passengers. This class had the greatest number of entrants and aroused by far the greatest enthusiasm.

Few Tire Troubles

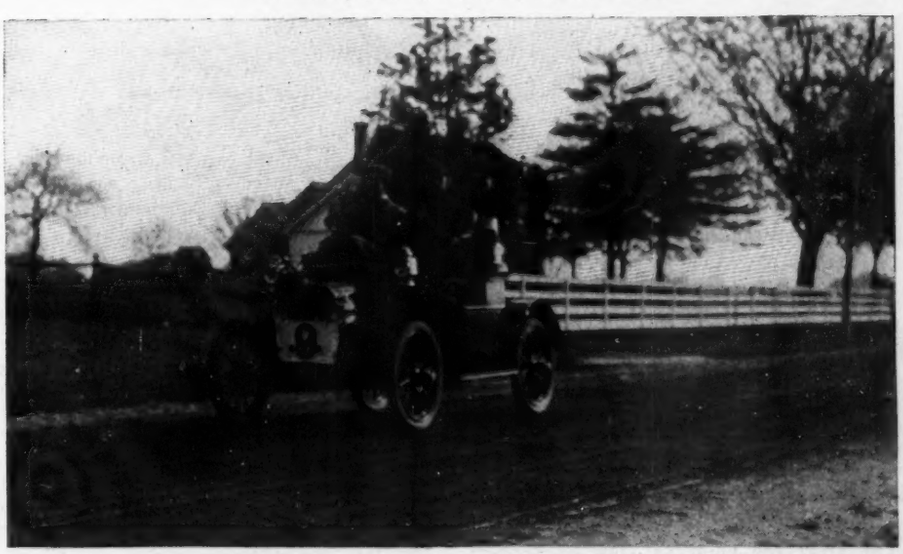
Like many other contests there were some troubles, but as far as serious accidents were concerned the afternoon's sport was not marred by a single mishap. Tire troubles, which often spoil a day's sport or mar an otherwise fine contest, were, strange to relate, noticeable by their absence, only one contestant and one of the official cars suffering a puncture. Beyond that there was no tire trouble.

Picturesque Long Island roads in the borough of Queens were the real scene of the contest. The route led from the clubhouse of the Automobile Club of America to the Queensboro bridge, and from thence through Woodside, Flushing, Bayside, Manhassett, Jericho, Hicksville and Freeport, via the Merrick road, returning to the clubhouse through Rockville Centre, Springfield and Jamaica.

ONE OF THE BUICKS



OVERLAND, ONE OF THE CARS TO WIN A CUP



CADILLAC, WHICH RETURNED GREATEST MILEAGE ON ITS GALLON

1-GALLON EFFICIENCY CONTEST

Cylinders	Empty Wt.	Loaded Wt.	Per cent Load	Mileage	Elapsed Time	Score	Class	No. Pass.
4	1900	2880	51.5	35.8	2:57	103.104	C	5
1	1125	2325	43	42.6	3:06	99.045	A	4
6	4025	5230	18.4	17.1	2:14	89.433	F	7
4	4450	5600	25.8	15.5	1:18	86.800	F	7
4	1695	2105	24.6	41.1	.....	86.574	B	3
4	2530	3260	28.8	25.9	1:34	84.434	E	5
4	2275	3045	30.8	25.7	1:26	78.300	C	5
4	2560	3220	25.1	23.9	.....	76.958	E	4
4	2730	3385	24.0	22.7	1:41	76.839	G	4
4	2370	3205	35.2	21.0	1:32	67.305	C	5
4	2530	3115	22.2	21.55	.....	67.128	C	4
4	2150	2580	20.0	24.95	1:57	64.434	B	3
4	3530	4215	19.4	13.3	1:10	56.059	F	5
4	2400	3050	25.2	17.8	1:26	54.290	G	4
4	2460	3090	25.6	18.0	1:19	55.620	G	5
2	2230	3070	37.6	18.5	2:07	56.835	B	5
1	1080	1370	26.8	40.6	.....	55.622	A	2
6	2690	3345	24.4	16.0	0:49	53.500	D	4
4	2436	3290	35.1	13.3	.....	43.757	C	5
4	1110	1420	27.9	20.9	.....	29.678	A	2

20 gallons; total weight of cars, 48,775; with passen-110; average weight of empty cars, 2,438.75; average all cars, 1:45:25; average power per cylinder, 6.07 horse age live load, 28.8 per cent; average weight of pass-per gallon, 1.52 mills per person.

DUST PROBLEM AS IT PERTAINS TO MOTORING

LONDON, ENG., April 28—The dust question has been occupying the minds of both the motor and the road engineer during the past year probably more than anything else, and there is no doubt but that upon its solution depends, to a large extent, the motor trade in Great Britain. Much good work has been done on both sides, but here the motor engineer has labored at a certain disadvantage since the modifications in design which he can produce are decidedly limited. Much, however, has been done in this way to minimize the dust raised by cars, and there are at present several makes well known for their non-dust raising qualities.

This side of the question, however, will never get much farther, since it is quite obvious that the very last person to be inconvenienced by his own dust is the motorist himself, and he scarcely can be blamed for refusing to pay for the motor manufacturers' cost and experiment in this direction. Given two otherwise similar cars—one which makes a lot of dust and another which makes a little—he will probably choose the latter, but the moment he sees that he must pay extra for the quality of raising little dust he immediately jumps for the cheaper and less considerate car. As far as cars go, the American type with good big wheels, small tires, and a clear run underneath, as emphasized in this country by the Cadillac, Buick, Ford, White, Stanley, etc., is far and away ahead of its British equivalent, and it is not unlikely that a return will shortly be made in British motor fashions to the larger wheel, as much on account of this phase as of its possible increase in economy and comfort.

Work of Road Engineers

On the other hand, a tremendous amount of most valuable work has been done by road engineers all over the British Isles, assisted as they have been by several important and influential bodies whose immediate care is the improvement of road-traveling conditions. The recent road conference convened in Paris has awakened much interest and led to a considerable amount of useful experiment.

The Road Improvement Association recently addressed a number of questions to all the county and borough surveyors of the United Kingdom to ascertain their views on the question of how best to meet the needs of a rapidly increasing motor traffic, which was leading in most cases to the roads being no sooner mended than rendered almost unfit for use. The practically unanimous opinion of these experts is that in tar, and tar alone, is the solution to be found. Throughout the country various patches of every conceivable kind of road have been laid down, but to the casual observer it has been patent that those roads, which were bonded with tar, are, from the point of view of dryness, freedom from dust, pot-holes, ruts, and liability to be damaged by frost, far and away ahead of all others. The only rational objection to tarring all roads is its expense, as it has been shown that unless the road is properly remade with fresh, clean flint and tar the best results are not obtainable. Merely spraying a road with tar is of little benefit, as it has great difficulty in working its way beneath the hard surface of the road from which a shower within a week of its application is liable to wash it.

Cost of Road-Making

At present the cost of making a road with tarmac, that is, newly-tarred flint or rock, is somewhat more than 87 cents a square yard, but thanks to the introduction of the machine described later this cost has been and can be reduced by more than 50 per cent, so that a more extensive use of tar is almost assured.

With this machine, which is the invention of a Mr. Ames and has been tested in use by the Warwickshire county council, one has, as it were, a device for making roads as you wait. All that is wanted are a few men, the machine and a steam roller fitted with a scarifier, a sort of mechanical pickax which breaks up the road surface to a depth of some 3 or 4 inches. The machine consists of a large sheet steel chamber partitioned off into various compartments, the whole thing being preferably mounted on wheels so as to be portable. The compartments are as follows: Tar tank, tar-dipping well, fire-box, flue, hot water boiler, hot water coils, drying chamber and mixing chamber, the last named being provided with conveyers and rocking screens. The method of operation is as follows: While the road to be resurfaced is being scarified, the tar macadam mixer, which is hauled up to its place of work, is heated together with the tar by means of the boiler and steam coils. The material scarified from the coils is then taken in barrows and carts to the machine and is tipped into a hopper. A bucket elevator takes the stones and feeds them into the drying chamber through which they are conveyed until all moisture is evaporated. The rocking screen slowly conveys the stone through the chamber at any desired speed according to the wetness of the stone and the time required for drying them, and new macadam is also run through with the old. As they are going through the drying chamber the rocking motion thoroughly cleans the stones and screens out all grit and small, fine material into a receptacle below from which it is taken and spread over the newly tarred macadam.

Process of Construction

The clean and heated stones fall from the screen of the drying chamber into a dipping well which is full of boiling tar and through which passes another bucket elevator which conveys the stones into the mixing chamber where they are mixed up thoroughly and discharged at the other end. During this passage of the stones through the mixing chamber all superfluous tar is drained off back into the dipping well. As the newly-tarred macadam is discharged it is coated with fine grit, sand or asphalt which forms a matrix for binding the macadam together and filling up the crevices when the steam roller passes over it. It is then conveyed on to the road by the barrows and carts used to bring the old material and is then spread and afterward consolidated by the roller in the usual way. As so made, it hardens and solidifies extremely quickly.

It will be readily understood what a great saving the use of this machine will effect, and it is obvious that a new era in road construction is dawning. Hitherto it has been necessary to send tarred macadam by rail in trucks and this has often resulted in the macadam hardening solid and refusing to be broken up. With the new machine, however—which by the way is patented in America among other countries—all this trouble is obviated and the dustless road brought within range of possibility. The machine is a rectangular box-like arrangement, about 20 feet long, 6 feet wide, and its chimney is 15 feet high.

GERMANY CATERS TO TOURISTS

Berlin, April 28—From the government records recently made public it appears that during the 12 months beginning October 31, 1907, and ending September 30, 1908, the number of touring parties in motor cars that entered Germany was 39.2 per cent greater than during the previous 12 months. The reason is directly traceable to the changes made in regulations governing the entry of foreign cars for touring purposes into Germany, and it is stated already that the figures for the year to end in October of this year will show a still greater increase, as further action has been taken to attract foreign motorists to Germany instead of having them keep out of the Vaterland because of unreasonable and drastic regulations. During the 12 months of 1907-1908 there came into Germany from France 2,950 cars, as against 2,234 during the previous 12 months; from Austria 1,637, as against 1,010; from Belgium 995, as against 567; from Switzerland 619, as against 327; from Holland 492, as against 430; from the United States 478, as against 477; from Great Britain 275, as against 272; from Russia 148, as against 63; from Italy 130, as against 151; from the grand duchy of Luxemburg 72, Denmark 48, Sweden 24, Spain 11, Argentina 5, Roumania 4, Egypt 4, Greece, Brazil and Turkey each 3, Norway 2 and one each

from Japan, Finland, Bulgaria, Servia, Tunisia, Mexico, Cuba, Peru, Hawaii and Salvador. On the supposition that each car stays only 3 days in Germany and that the total sum spent by those in the car while in Germany is $25 per person and in estimating that there is an average of three persons per car, it means that a total sum of $593,475 would have been spent in the 3 days for hotel accommodations, meals, supplies and repairs for car, incidentals. As a matter of fact, it is likely that the total sum spent in 3 days is nearer $50 per person than $25, as tourists will state.

BELGIAN REPORTS PROSPERITY

Brussels, April 30—Belgian car and parts makers during 1908 did better as a whole than the makers of many other countries, inasmuch as their exports increased. All told there were exported from this country 452 complete cars or chassis valued at $1,183,505 or an average of $2,618 per car. In 1907 454 cars were exported, their total value being only $1,054,289, or an average of $2,542 per car. The biggest buyer of Belgian cars was again Great Britain, 155 cars going there. Germany is second on the list, having bought 112 Belgian cars. France got forty-one, Holland thirty-nine. Only one went to the United States, while in 1907 three went there. The value of the parts exported was $1,063,359, while in 1907 it was $1,053,994 and in 1906 $773,205. Great Britain took nearly half, it being credited with $507,263 worth. Then follows Germany, France and Holland. The importation of foreign cars into Belgium decreased. The cars imported number 204, or twenty-one fewer than in 1907, but still twenty-two more than in 1906. The majority of imported cars come from France, 152 being credited to that country. Then comes Germany with twenty-five and Holland with ten. The motor cycle export business also shows an increase for 1908, as 2,073 two-wheelers were shipped out of the country, or sixty-four more than in 1907. In cash it was an increase of $10,700. Great Britain took the greatest number—940, or 113 more than in 1907. Australia is second on the list with 196 against 110 in 1907.

CHANGE IN SHOW DATES

New York, May 10—S. A. Miles, general manager of the National Association of Automobile Manufacturers, announces a change in the date of the national show to be held at Atlanta, Ga. Instead of from November 27 to December 4, as first announced, the week of November 6-13 has been chosen. The show will be held in the Auditorium armory, which contains approximately 50,000 square feet of space available for exhibits. The Chicago show will be held earlier than usual, the week of January 29-February 5 having been selected, a change desirable because of the earlier dates adopted by the New York shows.

Race On Dieppe Course Talked of in France

Paris, May 1—There is a possibility of a road race at Dieppe this summer, just as in 1907 and 1908, and with Victor Breyer again as manager. The French club has, of course, gone out of this line of business, and will have no other interest in the race than to come and watch how it can be run without its help. The idea was put forth by a number of Dieppe business men and officials to hold an open race, for private owners, professional drivers, and such manufacturers as cared to come in. There should be neither weight limits nor restricted bores and strokes, any type of machine being eligible. The idea caught on, and the offer was made to Victor Breyer to manage the race. Owing to the numerous government formalities which have to be gone through, it is practically impossible to hold the race, as originally intended, late in June or early in July. It is therefore proposed to put in on the program for the month of September. If this is agreeable to the Dieppe party, the matter will be pushed ahead and government permission asked. There is just a possibility of this being refused; but in view of the practically unanimous local desire for the races chances are in favor of it being held. Entries will not be difficult to find, for there are in and around Paris at least two-score machines constructed and raced in 1907 and 1908 which could rapidly be put in shape for another high speed test. British participation is certain, one leading firm at present having a team of three cars in racing condition having given the assurance that the cars will be entered if the race is held. Germany, Italy and Belgium can also supply cars which if not entered directly by their builders could readily be placed in the hands of private individuals for the purpose of racing.

TRADE CHANGES IN 'FRISCO

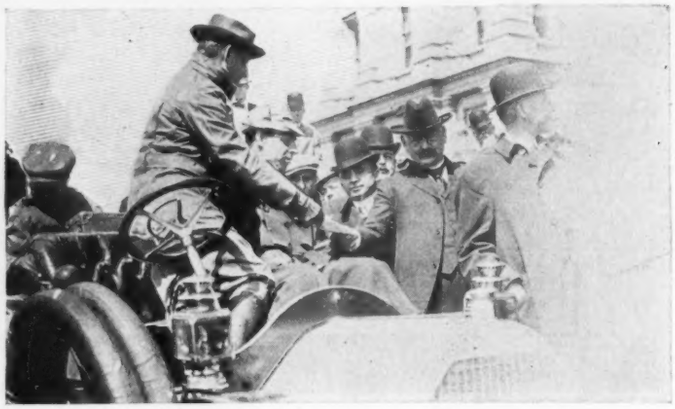
San Francisco, May 7—The local representation of two well-known cars, the Locomobile and the Stearns, has been changed during the past week. The Locomobile Co. of America has come to San Francisco with a branch, sending Irving J. Morse, its Philadelphia manager, here to start the ball rolling. He is new entirely to this territory, but he has already established himself in quarters on Van Ness avenue, one of the beautiful boulevards of the city. It is planned by the Locomobile company to erect a three-story class A building on this avenue, which is one of the motor business streets of the city. Negotiations are now in progress for a site, and construction will begin in the near future. J. Murray Page remains here as Pacific coast representative of the Locomobile company. Frank G. Miner, of the Greenland company, which for several years has handled the Locomobile as local agent, will retain for the present the privilege of selling Locomobile cars. The change in the agency of the Stearns came as somewhat of a surprise. When Charles B. Shanks last year became the general sales manager of the Stearns company he decided that his car was not being properly handled on the Pacific coast, and he sent out Charles B. Warren, formerly sales manager of the Haynes company, to put the agency on a good footing. Warren placed the car with the Reliance Automobile Co. C. S. Richardson, manager of the Reliance, subsequently took on the agency for the Herreshoff. The Stearns is a licensed car, while the Herreshoff is not. Consequently there had to be a parting. The establishment of the Locomobile branch here had left Frank Miner without a car, and Warren promptly placed the Stearns agency in the hands of this young motor car agent. The Speedwell is the latest arrival in the San Francisco market. It has been brought here by L. V. Lynch, a former officer of the National Cash Register Co. Mr. Lynch has established himself in quarters on Golden Gate avenue, and although he has been here little more than a couple of weeks, he has already sold five or six cars to well-known Californians.

BRIDGEPORT'S HILL-CLIMB

Bridgeport, Conn., May 10—At a meeting of the contest committee of the Automobile Club of Bridgeport held at the Stratfield the matter of classification for the hill-climbing contest to be held at Sport hill May 31 was taken up and decided. The classification is as follows: Class 1, gasoline, for cars $840 and under; class 2, gasoline, for cars $851 to $1,250; class 3, gasoline, for cars $1,251 to $2,000; class 4, touring, for cars $2,001 to $3,000; class 5, runabouts, $2,001 to $3,000; class 6, gasoline, for cars $3,001 to $4,000; class 7, gasoline, for cars $4,001 and over; class 8, amateur class for the president's cup; class 9, free-for-all, for Board of Trade cup. This classification is practically the same as that carried out by the Bridgeport club last year at Sport hill. President Frank T. Staples has offered a silver cup to be known as the President's cup, which will be awarded to the winners of class 8 for amateur drivers. The large copper cup offered by the board of trade last year, and one by the Isotta Import Co. of New York will again be put up as trophies for the free-for-all class, which must be won three times before the winner retains ownership. Arrangements have been made to patrol the course with state troops and in every way the same excellent management that prevailed last year will be duplicated this year. The contest will be in charge of A. L. Riker as referee. The entry blanks for this hill-climb are now ready and may be secured by writing to the chairman of the contest committee, Ralph M. Sperry, P. O. Box 518, Bridgeport, Conn.

PROGRESS OF FLAG-TO-FLAG TRAIL-BLAZER

CHALMERS-DETROIT PATHFINDING CAR



GOVERNOR SHAFROTH, OF COLORADO, BIDS SCOUTS FAREWELL

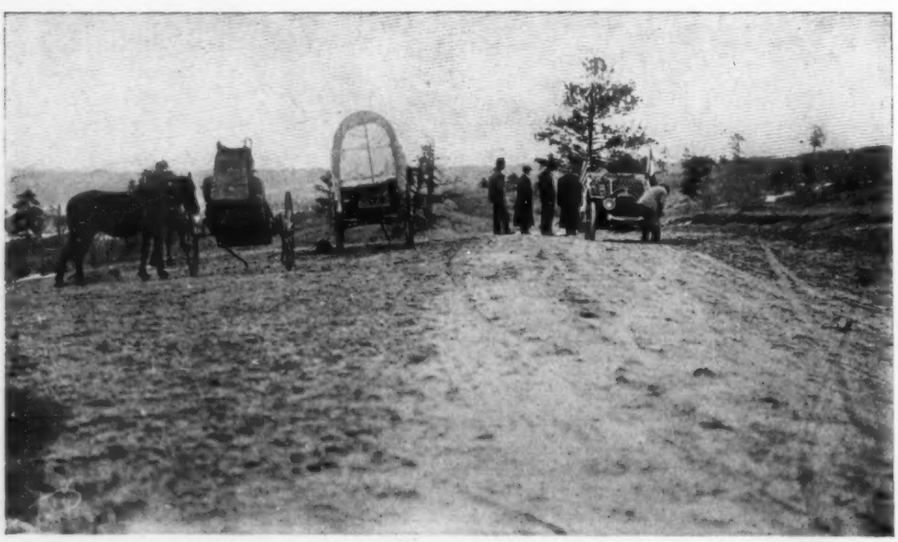
DETROIT, MICH., May 11—What gives promise of being a most interesting tour in the west is the flag-to-flag tour promoted by the Denver Motor Club and which will be run from Denver, Colo., to Mexico City, the start being made from Denver October 1. The route will lie south from Denver to Colorado Spring, Pueblo, and Rockyford to the north boundary of New Mexico, thence south across New Mexico, entering at El Paso on the Rio Grande river; from El Paso the trip through Mexico will practically follow the Mexican Central railway and include such Mexican centers as Montezuma, Chihauhua, Jinanez, Jennico, Camacho, Zacates, Aquas Calientes, Leon, Irapuato, Quereteo, San Juan del Rio, Tule and Mexico City. The tour will be for the Wahlgreen trophy and it is reported upwards of a score of entries have been promised.

Governor at the Start

The pathfinding work is at present being undertaken by a Chalmers-Detroit 30 car, the Old Reliable 30, which last year performed the 100-day run of 200 miles a day on the Detroit-Pontiac road. The car left Denver May 1, carrying with it a letter from Governor John F. Shaffroth, of Colorado, to President Crofirio Diaz, of Mexico, containing the wish for closer commercial relation between the Rocky Mountain regions of Colorado and Mexico, as well as promoting the mutual relationships between Denver and Mexico City. Fully a dozen machines escorted the pathfinder as far as Colorado Springs, where the first stop was made.

Fairly good dirt roads prevailed in the trip to Colorado Springs, and the ideal hotel accommodations that welcomed the travelers made them loath to leave the following day. They idled around the Antlers and watched their escorts take the back trail. At 2:25 p. m., however, they pulled out for Pueblo, making the run over good roads with no particular haste, through a rather desolate country.

Knipper, the driver, had brought along a gun and took several shots at prairie dogs and their attendant owls, but in every case they were too quick for him. Even when hit, the animals were so close to the entrance of their subterranean homes that they managed to dodge in and out of sight. There were thousands of them in sight, sitting in the bright sun. Partridges were also frequently flushed.



THE OLD AND THE NEW MEANS OF TRANSPORTATION

About 20 miles out of Colorado Springs, near the town of Fountain—so called for no apparent reason, as all the country was as dry as a basket of chips—the pathfinder met a caravan of Mexicans headed north. The horses of the caravan became scared and the car was run off the roadway to enable them to pass.

Alkali on the Ground

The ground was dazzling white from the alkali. Nearly the whole run to Pueblo was down-grade. In 44 miles the altitude decreased from 6,000 to 3,400 feet. J. W. Ebert, of the McDuffee Motor Co., of Denver, was the guide for this day. In all probability the tour will not follow the policy of the pathfinder in pushing along on the first Sunday enroute, but will stop at Colorado Springs and go sight-seeing, continuing the trip on Monday.

The pathfinders found rather poor hotel accommodations at Pueblo and were glad to get started again. Before setting out, however, the car was driven to a scale and weighed. The total poundage was found to be 3,850, of which the car itself represented but 2,200, making the overhead 1,650. This, of course, is considerably higher than would have been demanded for any ordinary trip, but was necessarily large from the task which lay ahead.

Picturesque Stretch Found

Out of Pueblo the route lay through a picturesque stretch of wild and desert lands in which homes were infrequent and the population was chiefly confined to the inevitable prairie dogs. After repeated attempts Knipper and his shotgun finally scored on one of the little owls. The road was excellent all the way, however, and touring was a pleasure at a rate of 15 miles or a bit faster. Several excursions were made from the roadside to get a shot at one of the big jackrabbits that loped along through the cactus. Beds of dried-up streams, which the natives term arroyas, were frequently crossed and always by modern and up-to-date bridges. The scenery of this district was typical of any arid region in this latitude and the sun

beat down from a cloudless noonday sky.

All this changed, however, when the century mark for the day's run was passed and the famous Rocky Ford fruit belt was entered. For miles the pathfinders progressed through a stretch of country, nearly all of which is devoted to fruit-farming. The center of the district is Rocky Ford, whence come the famous melons and where is held the famous annual gorge of the natives and friends, in a ceremonial that is virtually unique.

The pathfinding car left Denver Saturday afternoon, May 1. Colorado Springs was made the first day. Pueblo the second day, La Junta and Trinidad the third day, Raton, N. M., and Wagonmound, N. M., the fourth day, Las Vegas and Santa Fe the fifth and Albuquerque the sixth day. The car rested 1 day at a ranch near Las Vegas; it also stopped over on Sunday at Albuquerque. Monday, the 10th, it made Torrance, N. M. It was scheduled to make Alamagorda tonight and El Paso tomorrow. A day or two probably will be spent in El Paso before crossing the line into Mexico. The distance from Denver to El Paso is approximately 900 miles. The distance from El Paso to Mexico City is a little over 1,400 miles.

DETROIT'S RUN STARTS

Detroit, Mich., May 12—At 6:30 this morning the first car in the Detroit Automobile Dealers' Association's second annual reliability run was released from the control at Grand Circus park and sped on its way toward Lansing on the 200-mile trip scheduled for the opening day of the run. Like clockwork Bert Morehead, of the Goodrich Rubber Co., officiating as starter, moved the others up and sent them away in the order which they had drawn. A considerable crowd which had assembled, in spite of the early hour, wished the last starter a farewell and the tour to which Detroit motoring always looks forward as the main event of the season was on.

The entries in the run were as follows, competing cars being classified respectively at from $2,000 upward, from $1,000 to $1,999, and to those listed at less than $1,000:

TYPICAL SCENERY THROUGH SOUTHERN COLORADO

CLASS A, $2,000 AND UP

No. 1—Peerless; driver, Walter Bemb; observer, F. H. Harvey.
No. 2—American Simplex; driver, Charles Turnes; observer, H. Guthard.
No. 3—Chalmers 40; driver, Smith; observer, R. Cohen.
No. 4—Stoddard Dayton; driver, Harry Tuttle; observer, W. Crosby.
No. 5—Chalmers 40; driver, J. G. Vincent; observer, W. Weidner.
No. 6—Stevens Duryea; driver, Skip Scofield; observer, W. Mitchell.
No. 7—Oldsmobile; driver, ———; observer, J. Ward.
No. 9—Studebaker; driver, H. Cunningham; observer, Tompkins.
No. 10—Franklin; driver, C. S. Carris; observer, Dr. Gardner.
No. 20—Mitchell; driver, Gilmore; observer, ———.

CLASS B, $1,000 TO $1,999

No. 11—Chalmers 30; driver, L. Lorimer; observer, Van Aiken.
No. 12—Maxwell 30; driver, C. E. Goldthwaite; observer, Andrews.
No. 13—E. M. F. 30; driver, W. J. Lane; observer, T. J. Withey.
No. 14—E. M. F. 30; driver, H. Buyer; observer, Fay Oyler.
No. 15—Chalmers 30; driver, Bamford; observer, J. Schneider.

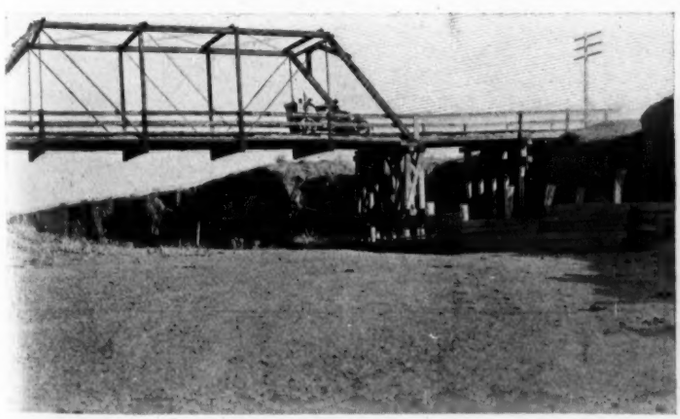
CLASS C, LESS THAN $1,000

No. 16—Brush; driver, D. B. Huss; observer, P. O. Opper.
No. 17—Brush; driver, McKenny; observer, ———.
No. 18—Hupmobile; driver, R. W. Keeler; observer, H. Doran.
No. 19—Maxwell Jr.; driver, D. Moran; observer, Joe Boyer, Jr.

The history of the event this year was somewhat peculiar. The run had been carded to start Tuesday. On Monday, however, there had been 4 consecutive days of rain and the roads were found to be well nigh impassable. The Dealers' Association held a meeting at which it was decided that the interests of all concerned would be best conserved by postponing the event until June, and this action was unanimously taken. On Tuesday, however, the day dawned bright and clear. A prediction of continued favorable weather was vouchsafed from the local weather observer. The arrangements for the run had all been made and the dealers called another conference. At this meeting, with but one dissenting vote, it was agreed to go ahead with the run today, merely changing the schedule so that the trip carded for Tuesday might be taken on Saturday, which had not been included in the schedule.

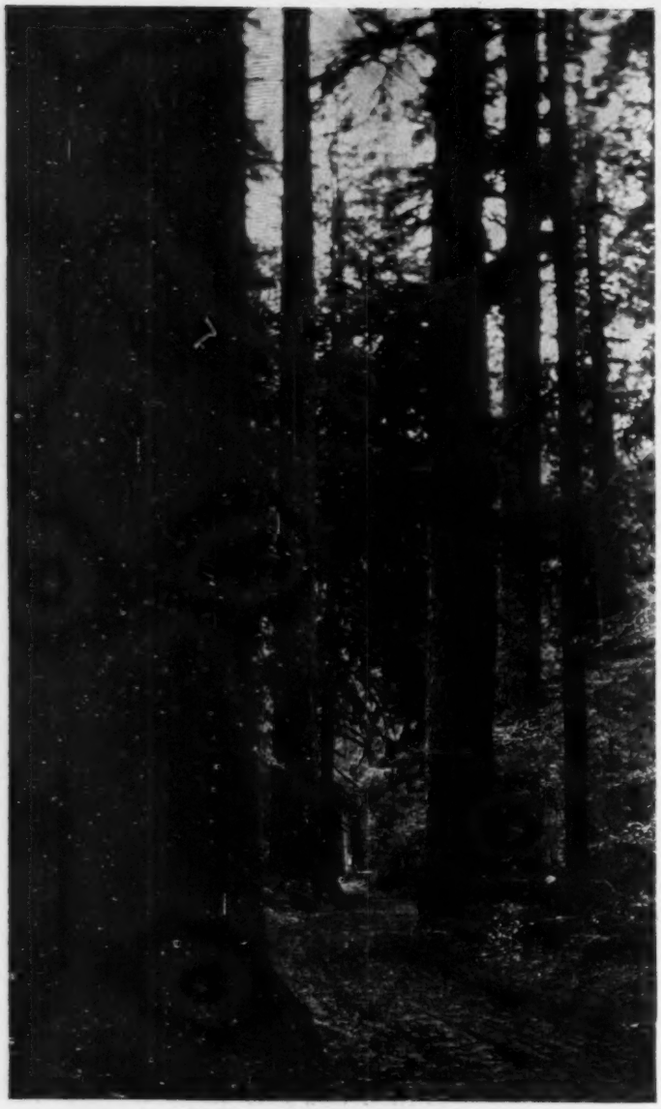
The run as started today contemplates a trip to some city about 100 miles from Detroit each day, with a return to this city for night, the cars being parked in front of the local headquarters under a guard each night. This enables the motorists and observers to spend each night at home and greatly facilitates the comfort of the tourists.

Today's itinerary took the cars out of the city by way of Grand River avenue, passing through the towns of Farmington, Brighton, Howell and Fowlerville to Lansing, returning by the same course.



CROSSING BRIDGE OVER DRIED-OUT RIVER BED NEAR PUEBLO

PATHFINDING CAR APPROACHING PUEBLO



In the Forest Primeval

Picturesque Motoring Route Found in the Far West

TACOMA, WASH., May 8.—Very few cities, if any in the country are favored with the natural romping ground from the motor car viewpoint that Tacoma is. It is less than 5 miles from the American lake prairie district, which with its excellent maze of roads is without a parallel, when its unimproved condition is taken into consideration. One of the most popular of these roadways is the one to American lake. It is on the shores of this beautiful body of water that the Tacoma Automobile Club has its clubhouse, and is the scene of numerous gatherings of the motorists, both winter and summer, every day being a motor day here.

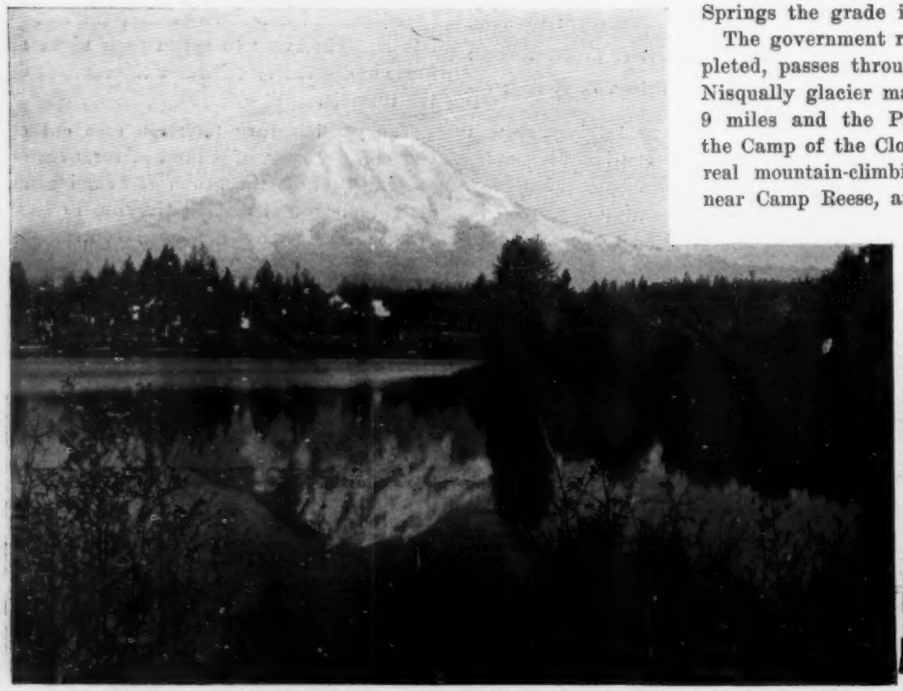
The roadway to Mount Tacoma, however, is by far the most popular with the motorists of Tacoma and those from the whole state of Washington, on account of the many beauty spots along the picturesque route. No matter where one may tour in the United States there will be no experience that can equal driving half-way to the summit of the mountain, which is one of the highest in the world.

Starting from Tacoma and taking the Fern hill road to Parkland along the suburban railway and thence to Spanaway lake, one of the prettiest of the numerous fresh water lakes which dot the broad prairies, the first 12 miles is quickly accomplished. Here one gets the first grand view of the snow capped and buttressed dome of Mount Tacoma, towering to a height of 14,529 feet; and then a ride of 34 miles to La Grande. From here following the canyon of the Nisqually river is Elbe 10 miles beyond. This canyon is over 400 feet high in places and its ruggedness is quite the opposite to the prairie-like scenery that leads to the foothills and the mountain grandeur.

In the fall of the year the roads for the most part are in excellent condition and the 10-mile stretch through the dense forest brings one to the next stopping place, Metzler's, where the motorist may, if so inclined, take advantage of the excellent hotel accommodations, and then a short run of 8 miles to the famous Longmire Springs. This is at an elevation of 2,746 feet.

From the springs up to Paradise valley and to the border of eternal snows is about 8 miles more and one is then at an elevation of 7,500 feet, or one-half the height of the mountain. Some of this last stretch is rather steep, but beyond Longmire Springs the grade is but 4 per cent.

The government road from here, which has recently been completed, passes through Paradise valley and skirting the foot of Nisqually glacier makes a loop and comes down the river about 9 miles and the Paradise river. From Longmire the trip to the Camp of the Clouds may be made on foot or horseback. The real mountain-climbing over fields of snow and glaciers begins near Camp Reese, and is a test of car and driver.



Mount Tacoma Rears Its Snowy Head

Rainy Season in Seattle

From the City of Tacoma To Historic Mount Tacoma

With the exception of the redwood forests of California, the forests through which one passes on this unique ride are the densest, heaviest and most continuous to be found in America, and together with the 400 species of wild flowers, which bloom in the valleys and natural parks, make the scenery very near to perfection.

Until recently this grand old mountain was proud in its defiance of man; now it is possible to make it 1 day's journey from Tacoma. Never before in the history of Mount Tacoma have so many motorists taken this trip as during last summer, and indications point to an even greater number during 1909, primarily on account of the splendid road which is becoming widely known among motor tourists.

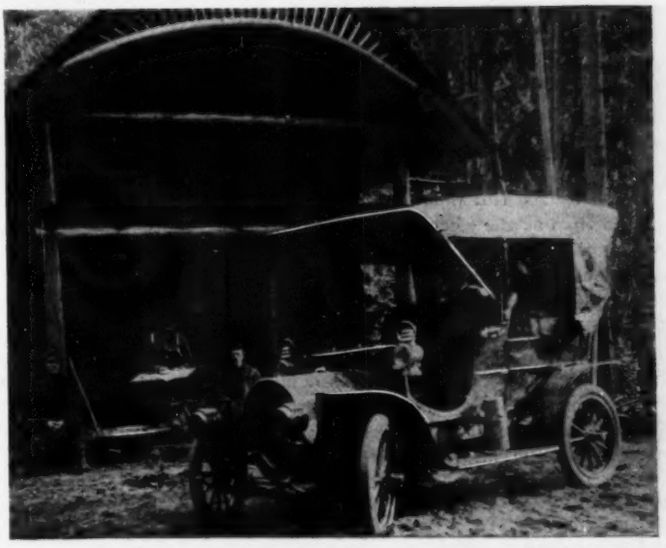
One of the most successful of the many trips taken to the mountain was during the last summer, when H. P. Grant, of the Seattle Automobile Co., and a party of thirty Seattleites made the trip in a dozen Franklin machines. Speaking of the trip Mr. Grant said:

"We enjoyed our trip to Mount Tacoma most thoroughly and could not have chosen a more delightful route. The rules regulating cars in the Mount Tacoma National park were a little strict, no car being allowed to enter or drive in the park excepting between 9 and 11 a. m. and 3:30 to 5 p. m. Upon meeting any teams the driver of the car must take the outside of the road, and if the horses show any signs of uneasiness must lead the team past the car."

Tacoma offers many attractions to the motorists in addition to the trip to the mountain, and no tour is complete unless one visits the attractive resorts in the immediate vicinity of the city. Wright park, situated in the center of the city, is a veritable beauty spot and an almost continuous string of motorists may be seen taking advantage of the splendid roads. Point Defiance park, embracing a tract of 640 acres, is perhaps the best known of any in the northwest. Point Defiance occupies a lofty and commanding position, overlooking an arm of Puget sound, which surrounds it on three sides, endowed with a wealth of majestic forest trees unsurpassed anywhere. Taken as a whole the park early asserted itself as a natural woodland resort, and the determination to preserve its most important and attractive natural features has always been acquiesced in by the citizens as an eminently wise one. Various new attractions are being added.

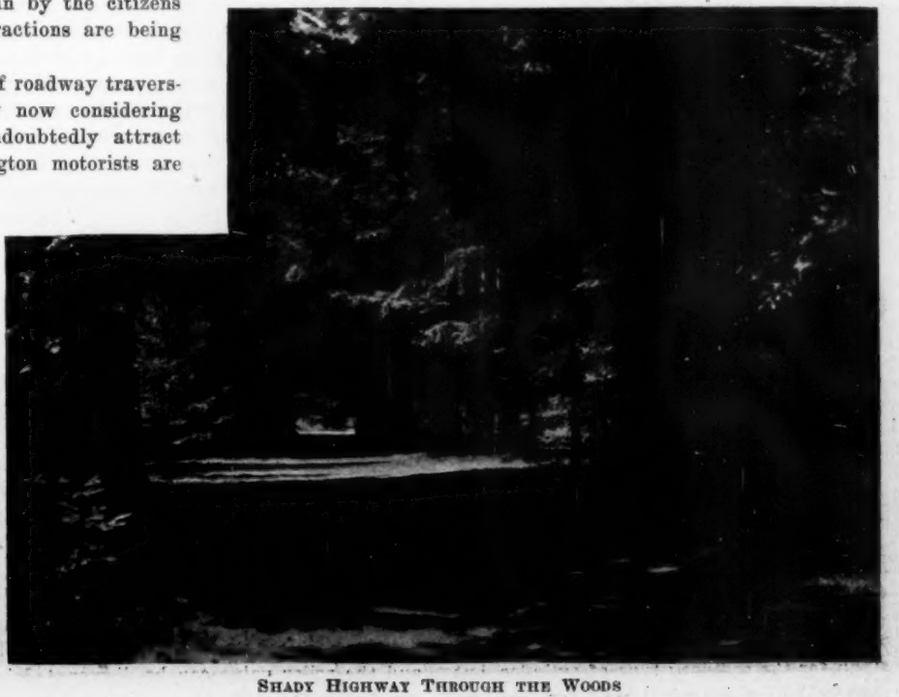
Point Defiance park has upwards of 8 miles of roadway traversing the park, and there is a local company now considering putting on a sight-seeing car, which will undoubtedly attract many to this already popular resort. Washington motorists are proud of the beauties of their state.

SAMPLE OF ROAD THROUGH FOREST



TOURISTS OFF TO MOUNT TACOMA

ONE OF THE OLD LOGGING ROADS



SHADY HIGHWAY THROUGH THE WOODS

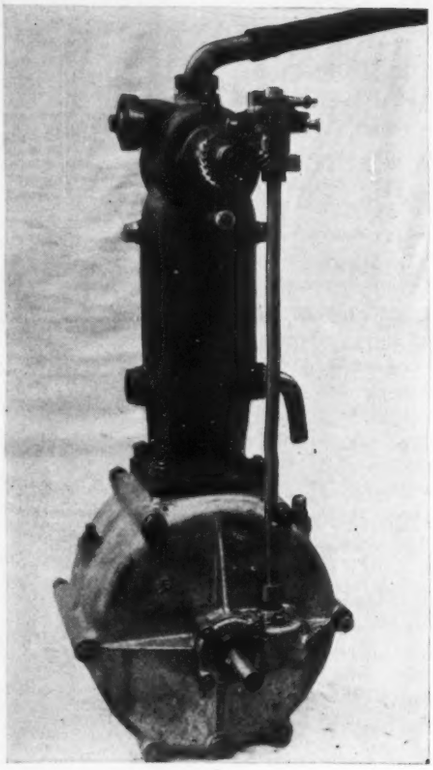
WHAT THE FRENCH DESIGNERS ARE DOING

PARIS, May 3—Since Charles Y. Knight achieved fame by convincing the Daimler engineers of the value of his sliding valve engine, other inventors have been at work endeavoring to find a substitute for the poppet valve. One of the most interesting of these creations has been produced at the Anzani factory. Instead of a double sleeve within the cylinder, Anzani has conceived the idea of a cylinder with a hemispheric combustion chamber having a groove right across its head opening into a tube, cast with the cylinder, in which are also two other ports, one communicating with the inlet pipe and the other with the exhaust pipe of the engine. A steel roller, cut through from side to side and along almost its entire length, fits into the tube and according to its position can fulfil the four functions of the internal combustion motor. Thus, starting with the roller valve in such a position that its single opening corresponded with the inlet port in the tube, and the admission port into the cylinder, a charge of gas would be drawn in. On the roller valve advancing the inlet port would be closed by the full face of the roller, at the same time as the closing of the entrance to the cylinder. While the charge is being compressed and fired the roller valve is revolving at half speed of the engine shaft, but it is not until near the end of the explosion stroke that its single opening has uncovered the exhaust port, allowing the spent charge to escape. On the next downstroke of the piston the roller valve has uncovered the inlet port and a charge of fresh gas is being drawn in through the opening which served for the expelling of the hot exhaust gases. The obvious advantage of this is that the roller valve is continually being cooled.

Cooling the Engine

The valve, however, is not left entirely to the fresh charge for its cooling, the chamber in which it revolves being surrounded by a waterjacket and cooled in the same way as the cylinder walls. In the accompanying illustration the inlet port is clearly shown; the exhaust port cannot be seen, but its position can be accurately judged from the external appearance of the cylinder head. The passageway into the combustion chamber is likewise invisible in the photograph, but it is immediately above the spark plug, of the same length as the inlet and exhaust ports, but only half the width across; thus as the roller shuts off either the inlet or the exhaust port, the connection with the interior of the cylinder is not closed immediately, allowing the entrance or escape of gases remaining in the passageway.

The practical application of the principle does not present any serious difficulties. The casting is rather more complicated than for the ordinary type of cylinder, but cannot be considered difficult for founders



ANZANI ROLLER VALVE ENGINE

capable of turning out four and six cylinders in one block. The command of the roller is also a matter that has been carried out with a remarkable degree of simplicity. A helicoidal gear off the mainshaft, a vertical spindle, near the head of which is a pinion meshing with the helicoidal on the end of the roller. The brass plate which serves as end bearing for the roller valve also carries the bearing for the vertical spindle; the opposite end of the roller is carried in a plain bearing composed of a bronze plate mounted over the end of the tube. The vertical spindle also carries the contact-maker, which on this model is of the simplest make-and-break type, thus further simplifying the engine. The position is excellent for the make-and-break, for it is accessible for adjustments, and cannot be reached by oil escaping from bearings.

Is a Single-Cylinder Motor

The engine illustrated is a single-cylinder of 3.9 inches bore by just a fraction under 10 inches stroke—exactly 250 millimeters—built for service on a racing car in the next voiturette contest. Up to the present bench tests only of the engine have been made, but they have been sufficient to show that the principle apparently is right. Enormous valve area can be obtained without any of the inconveniences of warped valves prevalent with large poppet valves, the roller valve is perfectly gas-tight, its parts are easily lubricated, and the roller valve can be dismounted in very much less time than any poppet type of valve. Its application to a multiple cylinder engine is no more difficult than its adoption to a single-cylinder engine, the best plan doubtless being to have a separate roller for each pair of cylinders. The performance of the engine will be watched with interest in the next race.

Small Bore Is Fancied

French constructors, encouraged by the numerous races for single-cylinder cars, have developed a type of engine of but 3 9-10 inches bore which will develop no less than 30 horsepower, and give a speed on the level of 60 miles an hour. When this year's voiturette races were announced the bore was not rigorously limited to 3 9-10 inches, with stroke unfettered, as in previous years; but manufacturers were given the opportunity of increasing their bore to 4 7-10 inches on condition that the stroke did not exceed the same dimension. If it was preferred to stick to the minimum bore of 3 9-10 inches, the stroke could not be carried beyond 9⅘ inches, this being considered by organizers the practical limit of the stroke.

In every case constructors are of the opinion that they can get better speed results by sticking to the small bore of 3 9/10 inches and the long stroke of 9⅘ inches, and in the next race there will be more engines of this type than ever before. Last year the Sizaire-Naudin was the only one to adopt the 9⅘ stroke, and had as its reward the winning of the race. This year its strongest rival has, among others, gone to these extreme dimensions. As a hemispheric combustion chamber is always employed, with valves in the head, the long-stroke engine becomes abnormally high, and if fitted with the usual type of radiator would have a greater wind resistance than many a Vanderbilt racer. In order to reduce this the bonnet is gradually narrowed in until it is about 6 inches across at the front, and the radiator is composed of two rows of plain copper tubes, placed lengthwise and not across the frame. A tank collects the water at the head and base of the tubes, the upper one having a pointed end in order to offer the least resistance possible. Viewed sideways, the bonnet is enormous, and to the uninitiated must cover at least a 100-horsepower racing engine. From the front the appearance is no less wonderful, for the mechanic, stretched on his back, is entirely hidden, while the driver only shows the upper portion of his face above the steering wheel.

Castor Oil For Lubrication

In the Sizaire-Naudin, the most successful of this type of engine, the reciprocating parts are made abnormally light, the piston has but one ring, and engine lubrication is entirely by castor oil. Georges Sizaire uses castor oil not only on the racers, but on the stock cars with which he

travels around the country in order to take part in various competitions.

So much rigor is shown by the Paris police against motor cars with smoky exhausts that constructors have of necessity been obliged to pay close attention to matters of lubrication. An improvement in this connection has been made by the Unic company in a new four-cylinder single-casting engine intended for taxicab work. The lubricating plunger pump, worked off the camshaft, draws the oil from the reservoir in the base of the crank-chamber and carries it to the two end bearings of the mainshaft, which is pierced, to allow the passage of the oil through to the connecting rod bearings. The unscrewing of a single nut on the pump cover allows of the withdrawal of the pump spring, permitting a change being made, if necessary, in a few seconds.

To provide against occasions when too great a supply of oil has been fed, the oil lead to the crankcase bearing is fitted with a tap, by means of which any excess can be drained off immediately, the engine pumping the oil through the tap instead of to the main bearings.

It is frequently found that through negligence the cock admitting oil from the reserve tank to the crankcase is left open, causing the flooding of the case. This is frequently done by washers, who open the tap inadvertently, with the result that the driver finds a gallon or so of oil in the case when about to start out, and has either to stop and empty it carefully or run the risk of attentions from the police. On the new Unic the oil tank, carried on the forward face of the dashboard, is horizontally divided into two compartments, the lower of which only holds about 1½ pints of oil. A two-way cock on the driver's side of the dashboard, when placed in one position, allows the passage of this quantity of oil into the crankcase. Before another dose of oil can be given the cock must be carried over to No. 2 position, which allows the lower tank to be filled. While oil is flowing into the crankcase the connection between the upper and lower tank is closed, so that it is impossible at one operation to empty in more than a pint and a half of oil, or under any circumstances to accidentally flood the crankcase. A gauge on the dashboard shows that oil is flowing from the upper to the lower tank.

The only other feature of the engine is the very compact setting of the cylinders, the casting being in one block, without a central bearing for the crankshaft. The valves are exceptionally close, so close, indeed, that there is but one cap for two, each of the four caps carrying a spark plug and a compression cock. The valves, of course, are all on one side.

Charron's New Small Four

Charron has made an addition to the small four-cylinder line which at the last salon was claimed to be the most simple car in the world, by the production of a slightly larger model rated at 16 horsepower. The general design is the same, but a few detail improvements have been made. During the show a reward was offered to any person who could point out a part which could be removed with advantage. Instead of removing parts, the firm has thought fit to make a few additions. Thus, the engine, which is in a single casting, with valves down one side, has been provided with a cover for the valves, secured by a couple of thumbscrews. As the piping has been reduced to a minimum and the wiring is contained in a single tube, a very clean-cut engine is obtained. Formerly the exhaust manifold was cast integral with the engine, on the same principle as on the Thomas taxicab in America. This has been abandoned in favor of a separate single-piece manifold, the exhaust pipe connecting up to it at the extreme end. The intake piping, however, is still cast in with the cylinders, there being but one connection from the mixing chamber to the engine.

The dashboard radiator with fan in the center, driven by belt off the mainshaft, is still retained, but the forward face is closed in a little more than formerly. The portion immediately behind the engine got no advantage from the draught created by running, and could be better cooled by confining the draught set up by the fan. Thus a couple of metal plates have been bolted down the face of the radiator, leaving only those portions which are outside the bonnet open to the natural current of air; the plates allow the forced draught to be drawn through the other portions with increased vigor. Ignition has only been modified by the addition of the Bosch self-starter, while the only change to the lubrication is an improved sight feed instead of the single gauge formerly carried on the dash. The steering wheel is carried on the left, with the change speed levers and brake in the center, the left-hand position of the driver believed to be more suitable for work in crowded traffic.

The de Dion-Bouton Co., which, by the way, has recently decided to give over a portion of its works to the manufacture of bicycles, has just produced an interesting type of motor car disinfecting van. The chassis is practically a standard type, propelled by a single-cylinder 12-horsepower engine forward under a bonnet. The disinfecting oven, formed of sheet steel, is carried on the special body, being mounted upon runners to allow of easy changes. The linen, etc., to be disinfected, is placed directly in the vat and not handled again until disinfection has taken place, for on arrival at headquarters the vat is dismounted and another one put in its place while the first one is undergoing the disinfecting process.

DISINFECTING VAN FOR SARTHE DISTRICT, USING SINGLE-CYLINDER DE DION ENGINE

Jersey Constables Foiled By Commissioner Smith

Newark, N. J., May 10—New Jersey Motor Vehicle Commissioner Smith and Justice of the Peace Naar, of Trenton, are having a little run-in as to the prosecution of fracturers of the motor regulations, and the matter has been referred to Attorney General Wilson for adjustment. It appears that the justice has received from local constables complaints to the number of 2 dozen or more, charging certain prominent Philadelphians, New Yorkers and others with highway incineration. When the justice turned over the complaints and the evidence to Commissioner Smith the latter said the expense of serving the necessary summonses would be too great, and referred the matter to the attorney general. Justice Naar, however, thinks it's up to the motor vehicle department to push the prosecutions, pointing out that in case of failure to prosecute or to require obedience to summonses the constables will lose the $2 deposit which the law requires for each prosecution against a non-resident. He pictures the dire results that will follow if the department refuses to prosecute; constables will naturally weary of being separated from much-needed two-spots, and will let the speedsters burn up the roads to their hearts' content and will not lift a hand to stop it.

SOME HINTS ON TRANSCONTINENTAL TOURING

FROM a scene of most difficult cross-country traveling, attempted only by record-seeking transcontinentalists, the desert and mountain regions of the western United States are being rapidly transformed—with improvements in cars—into one of the most fascinating touring grounds of the continent. Yet the motorist who attempts long runs through the rough and barren sections in which the west abounds, without the necessary special preparation and some foreknowledge of the conditions he will encounter, is simply courting troubles of a variety and abundance that will make all others met in his motoring experience seem tame by comparison. On the other hand, with any standard modern car in good order, with adequate equipment, and enough of the spirit of the pioneer to find enjoyment in minor hardships, it is safe to say that nowhere in the world can a more delightful outing be had than in a month's jaunt by motor with congenial companions through the interesting country between the Rockies and the Sierras.

In planning such a tour, no amount of preparation will avoid all difficulties, hence it is as important to select companions of some stamina as it is to choose equipment of thorough suitability. By this it is not meant to imply, however, that any particular physical endurance is essential, the writer knowing of several instances in which frail women and small children have made transcontinental trips with marked improvement in health. This doubtless is to be accounted for by the practically constant out-of-door life such touring enforces in climate of the utmost healthfulness.

Outline of Conditions

A brief outline of the general conditions certain to be encountered will help explain what is to follow. To begin with, so far almost all motor-car travel westward from the eastern edge of the Rocky mountains has had as a starting point either Cheyenne, Wyo., or Pueblo, Colo. These two cities, though both are at altitudes of about a mile above sea level, are neither of them in the mountains, being simply at the extreme western border of the great alluvial plains of the Mississippi valley, across which they are approached by an ascent so prolonged, uniform and gradual, that only the evidence of a barometer is convincing to the effect that one is not traversing level country.

Also, until the eastern motorist leaves the Mississippi valley by way of one of these two cities, he will encounter no conditions of a type with which he is unfamiliar. If he is unfortunate as to season, he will find some bad mud and less bad sand, but on the whole will get along about as in his home locality, perhaps occasionally delayed for roads to dry, or possibly by the necessity for horse aid if he carelessly blunders into too deep sand with too small tires. Roads he will find better than the average, unless wet; all water courses are bridged, settlements are close together, gasoline is low-priced and abundant, and night stops always can be made in towns where accommodations are both good and reasonable.

EDITOR'S NOTE—The following article on transcontinental touring will be found in the western edition of the Official Blue Book, published by the Class Journal Co., 1200 Michigan avenue, Chicago.

It is not until after entering the mountains that new conditions, in many respects beyond the imagination of the non-traveled easterner, supervene. From Cheyenne, through southern Wyoming to Ogden, Utah, and from Pueblo, through the Royal gorge of the Arkansas river to Salt Lake City, the two practicable routes through the Rockies converge to their Utah termini, 40 miles apart. From Ogden around the north shore of Great Salt lake there is a choice of main routes, each about 1,000 miles long, into San Francisco along the line of the Central Pacific railroad and into Los Angeles by cutting down through Nevada and southeastern California—the latter route affording the further alternative toward its end of running either through Death valley or the Owens river valley in California.

The Salt Lake Road

From Salt Lake City the southern main route can also be reached by following along the lines of the Salt Lake and San Pedro, or the new Western Pacific railroad, soon diverging from these into a run through the mountains to Ely, Nev. So far as the writer knows no motorist has as yet succeeded in following the line of the Salt Lake road all the way from Salt Lake City to Los Angeles. From Ogden there is a possible route to the northwest, which has been taken by a few transcontinentalists, and at least one car has gone east from Los Angeles through Arizona, New Mexico, and Texas, but for the average tourist it will be more satisfactory to follow the better-prospected lines of travel.

Throughout the country under consideration the going becomes chiefly an unending alternation of running through valleys and over summits, even the most desert areas being decidedly mountainous, contrary to popular belief among easterners. Nevertheless, the valleys even in the most unsettled sections will often afford 50 or 100 miles of ideal speeding. Indeed, there are tracts in Nevada of hundreds of square miles of almost level ground of natural road material, across which the highways, though improved only to the extent of occasional wheel tracks and sign posts, will admit of full speed with the most powerful cars—though unexpected small gullies are to be kept ever in mind by the driver unfamiliar with the road.

The mountain grades will not disappoint the most extravagant conceptions of them. Again and again before the coast is reached there will be killing climbs of miles upon miles on low-gear, with the ascent always severe and often for very short distances absolutely up to the limits of traction and engine power. Then will follow prolonged descents down which the tenderfoot will take the advice of the mountain and desert-wise chauffeurs and brake with his engine, or else learn to his sorrow that 3 or 4 hours of continuous down hill, dropping from 300 to 1,000 feet a mile will not merely char brake linings but will absolutely burn the brakes out of a car, wearing the brake drums to shells, and heating them not only enough to blister the paint but even enough to burn the spokes loose.

Using Engine as Brake

Water-cooled brakes and inorganic contact surfaces are of little avail, nothing but letting the car turn the engine over sufficing to dissipate the energy developed in the descent. In this connection there are a couple of tricks worth knowing. One is to disconnect the linkage, if any is provided, between emergency brake and clutch, so that brake and engine can be used together when necessary. Another is that when the car coasts too fast with one gear in engagement, but is not descending abruptly enough to turn the engine over at all with the next lower gear in, keep the lower in mesh and give the motor ignition and just enough fuel to keep the car moving.

In thus depending upon the engine for prolonged braking, it does not follow that the regulation brakes may be neglected. They should be kept at all times in the best possible condition, ready for instant use in stopping on both up and down grades, and for slowing while gear changing during the long coasts—a manipulation, by the way, that will be found just the reverse of the gear changing to which one is accustomed.

In climbing the long grades—sometimes gaining as much as a mile in height in going from 10 to 50 miles, it is of the utmost importance to keep the cooling system in good shape. In fact, there are very few cars in which the carrying of extra water for refilling the radiator will not avoid delays to let things cool during these long climbs. Slipping fan belts, dirt accumulated on the inside or outside of the radiator, or an ineffective circulating pump will make themselves known when their shortcomings would never be suspected under less severe conditions.

Climbs Affect Clutches

Clutches, too, which never cause trouble in thousands of miles of ordinary running, are prone to develop unprecedented weaknesses during long climbs. The safeguard, especially with leather-faced cone clutches, is never to let slipping begin, as

once started it rapidly progresses to the ruin of the facing. Dry litharge, dusted liberally upon the contact surfaces, is a western panacea for slipping leather clutches, and as it is not readily purchasable when most needed, a small can of it in the tool box is a safe precaution.

It is particularly important that the tires be of very large section, generally much larger than the normal equipment of the car, this being a secret of successfully traversing bad sand. None smaller than 4 inches should be used, no matter how light the car. Spare tires must be carried, of course, and an abundance of extra tubes is a necessity, as cemented patches cannot be depended upon in the hot climate. Also, it being any number of times easier to keep going in the sand than it is to start in it, never enter upon a long sandy stretch on the high gear unless the running is down hill, any attempt to change down the gears being almost sure to result in stalling. To start again, when all else fails, a piece of canvas tarpaulin, or even a few gunny sacks worked under the rear wheels, will do wonders. The car being run slowly on the low gear, the person who places the canvas can by a little hustling easily pick it up and regain his seat.

Bad places, while apt to be very bad, have usually the redeeming feature of being very short. Of the varieties most encountered, there will be stair steps in the rocks on grades, excessively steep and abrupt small gullies, fords, patches of deep or very slippery mud, and deep ruts at the sides or high rocks in the middle of the road. The first, on upgrades, can in some cases be surmounted with a low-powered car only by stopping, placing the low gear in mesh, speeding the engine, and then abruptly slamming in the clutch, trusting to good construction to stand the stresses on tires, springs and transmission. Bad gullies are best taken by rushing through on low gear, slowing for just an instant at the bottom of the descent if the rise is very abrupt.

Fording the Rivers

Fords with hard bottoms may be taken at high speed, and must be if very long, or else the water whirled into the bonnet from below will drown the engine. With high-tension ignition it is very easy in fording to cause short circuits that may require hours to dry out. Naturally, the drying-out process is more conveniently accomplished ashore than afloat, from which the logic of rushing through is apparent. A ford with very sandy bottom or an abrupt bank on the far side is better rushed on one of the lower gears. A ford with a rough bed of rocks is most treacherous of all, and, if possible, must be gone through slowly. If found in combination with high banks, it may have to be rushed at some risk, on low gear.

The worst place between Los Angeles and Utah is a ford of this description at Twin Springs, Nev. Piling a lot of sage brush into bad fords or gullies often will reduce the difficulties of getting through. Mud, unless very deep, can be traveled through rather easily with tire chains, while ruts and rocks will do no injury to any car with reasonable clearance if some care is taken in picking the road. Though the desert and mountain roads are very bad in spots, that they do not average so can be inferred from the fact that in one instance of which the writer knows a 4-inch tire, with 900 pounds on the wheel, ran from Los Angeles to Ogden without pumping.

In Nevada there are some motor car roads roughly maintained by the motor stage lines that have been responsible for the development of so many new mining camps, and as horse trespassing on these is a penitentiary offense, the sage brush grows high between the wheel ruts. And as it whips under a fast-running car it has a trick of turning on gasoline and water drain cocks if these are exposed and the precaution is not taken of wiring them shut.

Carrying of Gasoline

Many of the runs between settlements are of such length that no standard cars are built with gasoline capacity sufficient to cover the distance, so the carrying of extra gasoline becomes imperative. As gasoline is commonly sold in 5-gallon square cans in the west, two cans in a wooden case, these can be fastened to the running boards or elsewhere on the machine. They must be well secured against rattling about, or they will surely develop leaks. The same sort of cans can be conveniently used to carry water. It should be made a rule never to leave a settlement where gasoline or water is to be had without laying in a supply, unless it is positively known that the next supply can surely be reached without trouble.

Carelessness of this sort, in conjunction with a fuel consumption of a third of a gallon a mile through a long stretch of bad sand, once occasioned a party a 30-mile walk across the desert and 2 days' delay. Gasoline is cheap on the Pacific coast and east of Great Salt lake, but the prevailing prices, even along the railroads, are 40, 50, and 60 cents a gallon throughout the desert country. When there is time enough, and the schedule is sufficiently well defined, gasoline can be shipped ahead for less than it can be bought from point to point.

Water is as important as gasoline, for both car and occupants. A 5-gallon can for the machine and a couple of 2-gallon canteens for the passengers will be about right. With plenty of water to drink the dry desert heat is much more bearable than the humid weather of eastern summers, but without water for even an hour the hardiest begin to suffer, especially should any walking be necessary, while a dry camp is a desert synonym for misery. Much of the water that will be found is undrinkable, so the advice on this score should be had from the natives. Lubricating oil of proper quality is almost impossible to secure except at one or two of the big camps, so enough for practically the entire trip should be taken along.

Dry cells can be had in a few places, and when had will quickly deteriorate, if not already in bad condition, from drying out. Storage batteries can be charged once at most in the course of any possible trip. The result is that magnetic ignition of some type is imperative if serious ignition troubles are to be avoided.

Good Lights Desirable

Good lights are desirable for camping rather than for driving, as night running under no circumstances should be attempted. As surely as it is it will result in getting lost, for no matter how well the road itself may be illuminated, the inability to keep track of the general topography of the country will end in missing the road, which, being ordinarily a mere wagon track, can be easily confused with some similar track, perhaps made months before, branching off to one side.

The route should be inquired and verified at every opportunity, as a 100-mile run without meeting any one is always to be anticipated. In contradistinction to first ideas of the tenderfoot—accustomed to rural ignorance of local geography in the populous eastern states—directions secured from teamsters and others can be depended upon absolutely, even the mileage given often coming out almost exactly on the odometer. Ignorance of the road through the deserts may too easily mean calamity to be permitted to any one. Pencil sketches should be made embodying information secured, distances being such that the best memory is scarcely capable of following the often complicated directions. In the lack of better data, the post-route maps issued by the government will be helpful, while the government topographic maps are particularly useful to the extent that they are to be had for the localities traversed.

By careful planning and avoidance of unscheduled delays, night stops can be usually made at some sort of habitation, but a camping outfit, including blankets and perhaps pneumatic mattresses or sleeping bags, is certain to come in handy. A several days' supply of condensed foods, together with an alcohol-cooking outfit, also will prove its usefulness, besides being another means of saving money. A tent is not particularly necessary, as rains are very brief and uncommon during the season when motoring is practicable, but the car should have a top if only to protect from the sun, while a tarpaulin can be used as a protection against any inclement weather that may chance along, besides being useful in sand to keep dust from the baggage.

Care of the Skin

A very important precaution, which can be neglected only to be regretted, is the care of the skin. The alkali invariably

present in the desert dust is excessively irritating to the most calloused complexion if permitted to enter the pores, and often causes violent acute eczemas that can be counted upon to spoil all enjoyment for a week or 10 days. The only preventative the writer knows of is the rather disagreeable but quite efficacious expedient of thoroughly greasing the face, neck and hands with cold cream before each day's ride. Washing in strongly alkaline water also is to be avoided, it frequently proving worse than going dirty.

It almost goes without saying that at least one of the party should be not only a good driver, but a thorough mechanic, resourceful enough to improvise any possible repair. For the same reason a complete outfit of tools and spare parts should be carried. Of the latter the most important are extra bolts and nuts, quantities of wire and cord, some rivets and pieces of sheet metal, and extra spring leaves. Of tools that are not ordinarily carried a good gasoline blow torch and soldering outfit are most important, with the addition of a good breast drill with a chain to hold it against irregular work. Several hundred feet of ¾-inch rope with a couple of double-sheave pulleys will sometimes help the car over a difficulty that cannot be surmounted otherwise. For the very cautious, a party traveling in two cars would afford ideal safeguard against breakdown, besides being a great help in bad places.

No Need to Remodel Cars

There is little occasion to remodel any up-to-date car for such a trip, except that all the spring-eye and shackle bearings should be provided with oil holes, or better, with grease cups.

MODERN WAY OF HANDLING MOTOR TRADE

SYSTEM and organization are the keynotes of the business of the Maxwell-Briscoe Motor Co. in the disposing of the outputs of its three factories and the elaborate scheme which has been evolved is declared to work perfectly, covering the entire country so effectually that if President Briscoe wishes he can immediately find out where each car he ever made is located, who owns it and what satisfaction it is giving. The history is all at his fingers' ends and compiled through the co-operative system in vogue with the company, by which each man is a cog in one giant machine, which revolves around the president, who is in close touch with everything going on. He is the master link between the sales department on one side and the factory organization on the other. He controls the secretary, who in turn looks after the publicity department, the car order department and the parts order department. He also is in touch with the treasurer, who supervises the accountant and system departments. Then, through the president again, there is the advisory board, made up of the heads of all departments; the vice-president and general superintendents. Going the other way, the president looks after the sales department through his district managers.

The accompanying diagram gives a good idea of the Maxwell system. The season's campaign is first outlined by the advisory board, which is made up of the district managers, superintendent of sales, secretary, treasurer, general superintendent and vice-president, whose recommendations are taken up by the chief engineer and designing department. The models decided upon, the factories immediately get busy, prizes being offered to the leading superintendent and foreman. This part settled, the sales department starts its campaign through its system of district managers.

As at present constituted, the country is divided into nine districts, with a district manager in charge of each, with the exception of one in the far west, where two jobbing concerns act in the capacity of district managers. Under each district manager are the branch houses and agents in his territory, while acting under his orders are traveling salesmen whose duty it is to visit the various dealers and see if they are getting the cars they have ordered; jollying the customers and if any of them have any complaint see that they are looked after. In case a dealer is not doing much a traveling salesman is sent to drum up business. These traveling salesmen are termed blockmen, who make daily reports to the district manager, who in turn reports to the factory once a week.

The duties of the district manager are many and varied. Every order for every car sold in his territory must go through him. No dealer can go to the factory direct and place an order. In this way the district manager really acts in a jobbing capacity, although not financially interested. At the beginning of the season he sizes up the situation and tells the main office just how many cars he wants and gets his allotment at each plant. Then it is up to him to sell that allotment.

In this way the competition keeps every department working at its highest efficiency. Starting with the dealers, the agents are vying with each other, while the branch house managers have to hustle to keep up with their friendly rivals. So do the district managers and so on up to the president himself. The house organ shows the standing of every member of the sales department once in 2 weeks, along with a statement giving the percentage of sales, which is based upon the dollar's worth of sales in proportion to the population and selling expense. Prizes are distributed every 4 months to the leading district managers, branch house managers, block men and dealers.

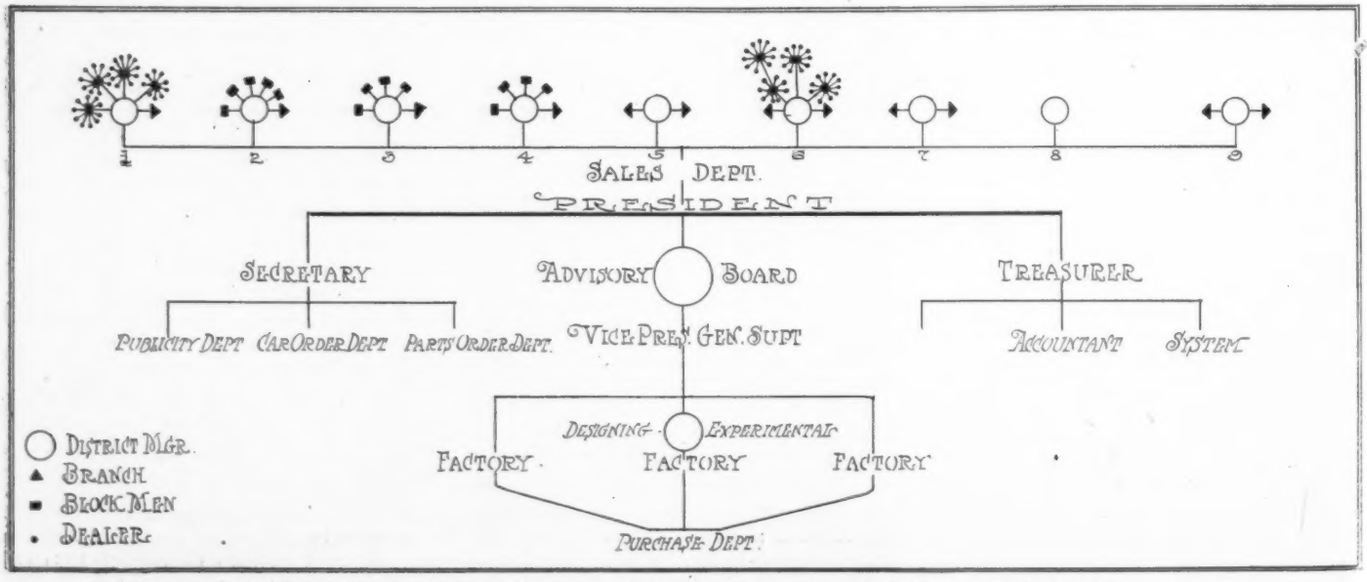


DIAGRAM ILLUSTRATING THE BUSINESS ORGANIZATION OF THE MAXWELL-BRISCOE MOTOR CO.

Legal Lights and Side Lights

CANNOT COLLECT TAX

IT begins to look as if the wheel tax imposed upon the motorists of Washington, D. C., by the last congress is a big joke. How to collect this tax was a question that the board of commissioners submitted to the corporation counsel. The wheel tax law was incorporated in the district appropriation bill and is as follows: "Hereafter there shall be assessed and collected an annual wheel tax on all motor cars or other motor vehicles owned and operated in the District of Columbia having seats for only two persons the sum of $3, and all such vehicles having seats for more than two persons an additional tax of $2 for each additional seat." The question was first referred to the district assessor, but owing to its conflict with other laws regarding taxes on motor cars, was then submitted to the corporation counsel. The latter has not yet ruled on the matter. In reporting back the matter to the commissioners the assessor said: "Although the law requires that such wheel assessments shall be made, no method for assessment is provided, nor is any time specified in which the assessment is to be begun. I assume that this wheel tax should be handled by the license division of this office, and that the work should be begun at once, although on account of uncertain preliminaries, it will take about 2 months to have books ready and notices made out. After that the money is to be collected by some means not provided by law, and as there is no penalty provided in the act, there is no way of collecting the tax where parties refuse to pay. It is, therefore, inoperative, and needs some amendment to put it in force." Motorists are confident that the wheel tax will not be imposed this year, and if some loophole can be found to make the present wheel tax law effective they will fight the matter out in the courts.

As fatal defects have been found in the wheel tax law passed by the last congress, the authorities of Washington, D. C., are endeavoring to correct these defects by an amendment to the police regulations relative to changing the color of the identification tag each year. Members of the Automobile Club of Washington, as well as unattached motorists, are closely watching the matter, and if the proposed amendment is put into force they will inaugurate a fight to prevent its enforcement. The proposed amendment, which the corporation counsel of Washington is now scrutinizing, is as follows:

"Beginning July 1, 1909, and each year thereafter, the color of the identification tag shall be changed from that of the previous year, and every motor vehicle shall, within 30 days after July 1 of each year, display the tag of the color provided by the District of Columbia for the year beginning said date. No extra charge shall be made for the new identification tag when the tag for the previous year is surrendered at the time application is made for the new tag; but the secretary of the automobile board shall not deliver a new identification tag until the applicant therefor shall have surrendered the duplicate of a receipt of the collector of taxes for the payment of the annual wheel tax, as provided in the act of congress dated March 3, 1909, and an additional number tag of the color of the identification tag, the figures to be not less than 2 inches high, with strokes not less than ¾ inch in width, designating the number of seats the vehicle is licensed as having, shall be supplied by the District of Columbia and rigidly fastened to the lower part of the identification tag and displayed on the vehicles, as provided for the identification tag."

IOWA HAS INSURANCE LAW

By the provisions of the new White law in Iowa, owners can for the first time since the motor car made its appearance in the state, insure themselves against loss from explosion, reckless driving and accidents of all kinds. The White bill adding motor cars to the list of property that may be insured against any casualty has just become a law by publication. As a result fire insurance agents in every Iowa city are doing a land office business, and incidentally making trouble for the insurance department. Iowa companies are preparing a new form of insurance policy for motor business but the large eastern concerns have begun the use of the policy forms used in other states, which, in several instances do not comply with the laws and regulations of Iowa.

OHIO LAW MONEY-MAKER

The state of Ohio is becoming richer by about $500 a day from the proceeds of the Ohio motor law which has been effective since June 10, 1908, and which was materially amended at the recent session of the general assembly. The report of Superintendent Fred H. Caley shows that the proceeds will average between $75,000 and $100,000 yearly. The cost of conducting the department has been materially reduced since its removal from the state house to the eleventh floor of the Harrison building, where it is now housed. The force of four clerks can now take care of all business when six or seven were necessary in the state house. The recently amended Ohio law is cited as a model in a letter written by Attorney Charles Thaddeus Terry, of the A. A. A. Mr. Terry says that the New York law will soon be enacted, which is copied after the Ohio law in many respects.

DEMAND RECIPROCITY

Ohio tourists are warned by the Ohio state motor car department that if they are molested in Pennsylvania because of their failure to procure the Pennsylvania tag they should notify the department so suitable action can be taken. Superintendent Fred H. Caley, of the department, in looking over the recently enacted Pennsylvania law found that its reciprocal features are not effective until January 1, 1910. When this fact became known, the department decided to compel Pennsylvania tourists to secure Ohio tags when crossing the state line if Ohio tourists are molested when across the Pennsylvania line. Up to the present time no word of arrest or molestation on the part of the Pennsylvania authorities has been reported.

HOUSE PASSES SCHANTZ BILL

The Schantz bill has finally been passed by the Michigan house, but it has been amended in several respects. The most important change is in the license provision. Instead of a graded tax, based on horsepower, Mr. Schantz has provided for a flat license of $5 on every motor car and $3 on motor cycles. In addition, each manufacturer shall pay $10 for each different model he makes. Chauffeurs who drive for hire must in addition pay a license of $4 yearly. There are about 9,000 machines in the state and the present license is $1 apiece. It is estimated that the new law will raise $50,000 or more every year. After the expenses of collection have been paid the money is to go into the good roads fund of the highway department. The senate has to pass on the measure yet.

ONE BADGER BILL KILLED

The Wisconsin legislature has killed the bill by Senator Pearson prohibiting persons under 17 years of age from running motor cars under penalty of a fine or imprisonment. This bill was opposed by the Wisconsin State A. A. on the ground that its passage would lead to other more restrictive measures, and that the liability of permitting persons under 17 to drive was a matter of greater concern to the owner of the car than to the state.

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

SPECIFICATIONS FOR GARAGE

LAWTON, OKLA.—Editor Motor Age—Through the Readers' Clearing House will Motor Age give up-to-date plans and ideas for erecting a good garage, 50 feet wide by 120 to 150 feet deep? We want an office 25 by 50 feet on one side of the front. We desire a general plan with entrance and exit, showing office, storage and salesroom on one floor. Also give plans for handling gasoline and oils, for transmitting it to the cars, arrangements for washing, cleaning and varnishing, and also means for getting cars on a bed or elevated platform.—P. M. C. Co.

A convenient garage and salesrooms such as you speak of are illustrated herewith, being 50 feet frontage and 150 feet depth. The offices 25 by 50 feet are located well to the front, the small reception space with table and chairs being in front of that. The other half of the front of the building is occupied by a salesroom with space for four cars, back of which is space for varnish room, leaving aisle room between the varnish room and the offices. At the left side is the enclosed drive space which is a most valuable asset in city salesrooms, as demonstrators can go out and return this way instead of often having to drive through a muddy rear alley, through which no prospective buyer, taking a demonstration, cares to go. An entrance leads from the salesroom to this driveway. Immediately back of the offices is the stock room with window at the rear opening into the repair department. At the rear center is the entrance, to the left of it the gasoline and oil pumps, and to the right the wash rack. When many cars are stored lockers should be provided along the walls back of the cars. An electric charging plant, if it is to be installed, should be fitted immediately in rear of the repair department. In a one-story garage it is not advisable to have the repair department on the ground floor, where it is too convenient to chauffeurs and others who may pick up tools or unnecessarily interfere with the repair system. A varnish room should be on the second floor, as a high temperature is necessary, excellent light and absolute freedom from dust are also needed.

THEORY IN BACK-FIRING

San Antonio, Tex.—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me what was the cause of a motor kicking? When a friend of mine was motoring, the engine stopped; investigation showed two magneto plugs were out. He replaced these and attempted to crank the engine. The crank struck his wrist, breaking it. Strange to say the machine started to run all right. I have always thought such a kick was caused by back-firing, and if this particular engine back-fired, why did it run properly afterward?—Subscriber.

The condition you speak of is reported every week from garages and second-hand repair shops. What happens in case of a back-fire, after which the motor starts running in the correct direction, is that compression in one of the other cylinders starts the motor in the proper direction. When a back kick occurs and the crankshaft rotates in the reverse direction, that rotation must first be stopped and a rotation started in the correct direction. To stop the back kick or reverse rotation requires power, and to again start the correct rotation calls for power. The forces that stop the back kick are, the arm of the person cranking the weight of the rotating flywheel, and forcing one of the other pistons to compress the mixture. The force that starts the flywheel in the correct direction is the expansion of the mixture which was compressed in one other cylinder. This is diagrammatically illustrated in Fig. 2, in which the piston in No. 1 cylinder has not reached the top dead center on the compression stroke, when the spark occurs and the reverse movement of the crankshaft starts. In tracing out what happens the valve locations must be considered. Both valves—intake and exhaust—in No. 1 cylinder are closed on the compression stroke and they will remain closed on the back kick stroke. Had the motor been running, No. 2 cylinder would have been going down on the explosion stroke of the piston, but as there was no previous explosion, the motor having been idle, the cylinder would be filled with mixture, with both valves closed, as they always are on the explosion stroke. The piston in this cylinder was normally going down; but, as soon as the back-fire occurred, the piston would start up and the valves remaining closed, the mixture would be compressed. This pressure would help to stop the back kick, and immediately the power of back-kick was over the compression would start the piston down on the proper explosion stroke, which would prove of sufficient power to carry the motor past the firing point in the other cylinders. Cylinders 3 and 4 would not be factors at all, in that the piston in No. 3 would, when the back-kick occurred, be near the bottom or end of the suction stroke with the intake valve open, and when the reverse action of the piston set in it would start rising, simply driving the mixture out through the open intake valve

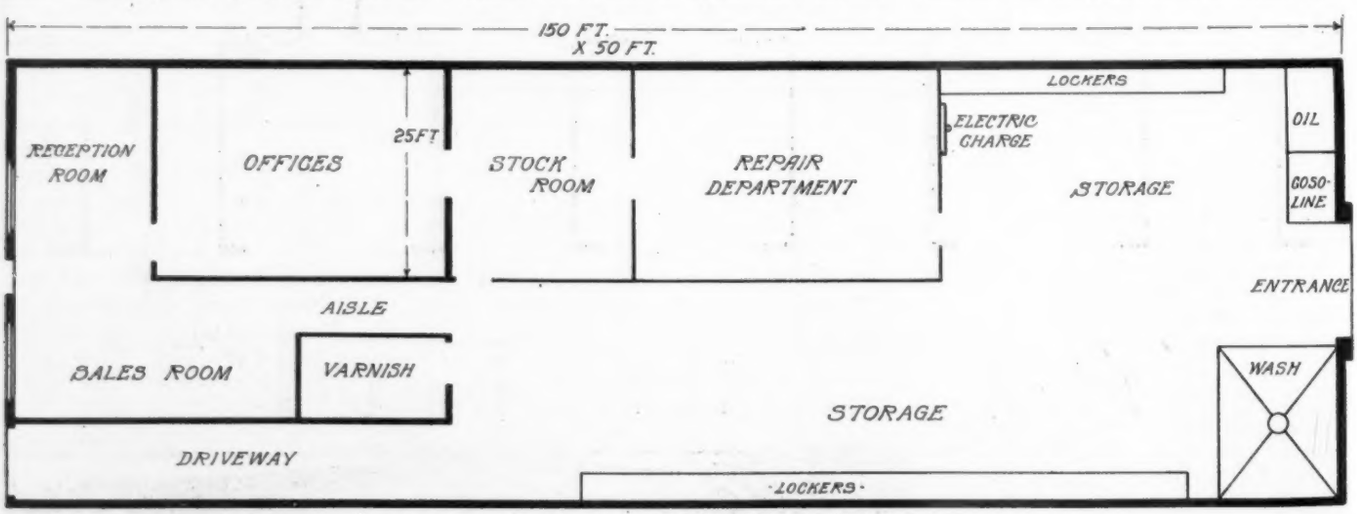


FIG. 1—FLOOR PLAN OF ACCESSIBLE GARAGE AND SALESROOM

and through the carbureter. Cylinder No. 4 was near the completion of the exhaust stroke when the back-fire started, and the exhaust valve was open. During the reverse motion caused by the back fire, the piston would start descending, the exhaust valve remaining open, exhaust gases would be drawn into the cylinder from the exhaust pipe.

SEVERAL ALUMINUM ALLOYS

Santa Cruz, Calif.—Eidtor Motor Age—Will Motor Age furnish us with a formula for aluminum alloy suitable for castings? —Enterprise Machine Works.

There are various aluminum alloys, the usual run of which is as follows:

First alloy, aluminum 92, copper 8 per cent.

Second alloy, aluminum 88, zinc 6, copper 6 per cent.

Third alloy, aluminum 80, zinc 16, copper 4 per cent.

Fourth alloy, aluminum 70, zinc 30 per cent.

These several alloys are made up to meet the several conditions, but in many foundries heavier zinc and copper alloys are used in order to produce weight.

SIX MOTORING QUERIES

Cincinnati, O.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions: 1—What is the highest speed ever attained by an engine, whether steam or gasoline, and how were the valves operated, by cam or rod? 2—How can I increase the speed of my two-cylinder opposed motor, 4½-inch bore and 5-inch stroke? I am advised that the motor should show 1,500 revolutions per minute, and I get only 900. 3—What length should the compression space be, and how much compression should the motor show on turning by hand? 4—Would it improve the motor if an opening from ⅞-inch to 1-inch in diameter is made in the bottom of the carbureter throttle? 5—Will Motor Age explain the armature winding for high-tension magnetos? 6—Will Tobin bronze make a good crankshaft bearing?—Subscriber.

The highest crankshaft speed attained by a gasoline engine has been 3,000 revolutions per minute, which speed has been maintained for but a very short time. This applies to motor car engines, although small air-cooled motor cycle engines have been run at speeds above 3,500 revolutions per minute. In all of these the valves are operated from camshafts with lifter-rods to the valve stems. 2—Not knowing the details of design of your two-cylinder opposed motor, or the weight of the parts, or the size of the valves it is impossible to state the crankshaft speed. With a 5-inch stroke your piston speed at 900 revolutions is only 750 feet per minute, which is very slow. At 1,500 revolutions per minute the piston speed would be 1,250 feet per minute, which is a little higher than you should expect to operate it. The speed can undoubtedly be increased by increasing the valve diameters which, in your case, will be almost impossible to accomplish. You can only depend on the utmost accuracy of timing, careful adjustment of the carbureter, and good lubrication for higher speed than you are getting. 3—The cold compression of your motor should be from 65 to 70 pounds per cylinder. 4—It is not definitely understood what you mean by the opening mentioned. 5—The armature winding in a high-tension magneto consists of two parts: First is wound a great many windings of a coarse-gauge of wire, and outside of this is wound a vastly greater number of turns of finer-gauge wire. The first winding is designated the primary, and the latter the secondary. The end of the primary is generally continued into the start of the secondary. The start of the primary is conducted through the armature shaft to the breaker box. The second end of the secondary leads to the distributer center. 6—Tobin bronze would not serve for crankshaft bearings as it is too brittle and hard. It is a particularly tough metal and can be used for such purposes as shafting in water and oil pumps.

GARAGE STORAGE RATES

St. Louis, Mo.—Editor Motor Age—Will Motor Age inform me regarding garage-keeping? What is the custom of charging for floor space, washing, and other privileges, such as storing a car through the winter? Is the price regulated according to the size of the car?—Subscriber.

Garage rates vary according to the size of the car and in Chicago they range from $15 to $35 a month, which includes washing the car, polishing the brass work, keeping the kerosene lamps filled and cleaned and pumping the tires when needed. Of course, in a big city like Chicago there is a variation in the prices according to the location of the garage. For instance, the Chicago Automobile Club has the only garage inside the loop district, which is for the use of members only. The club charges 25 cents for each 12 hours to what might be called the transient trade—those members who do not make a practice of keeping their cars at the club regularly. These transients pay 75 cents to have a car washed and from 50 to 75 cents for brass polishing, according to the amount of brass. In the 12-hour period the car may be taken out as often as desired without extra charge. The club does not take any dead storage. The monthly rates include washing and polishing the car as often as it needs it—twice a day if necessary. For a small runabout of the Maxwell type the monthly rate is $15. The next step is $20, for four-cylinder two-passenger roadsters of the medium type; $25 is charged for the average touring car; $30 for the larger one, which includes some of the limousines; and $35 for the big limousines and seven-passenger touring cars where there is a lot of brass work and woodwork to look after. At these rates the club could not make money, it is claimed, if the rent of the

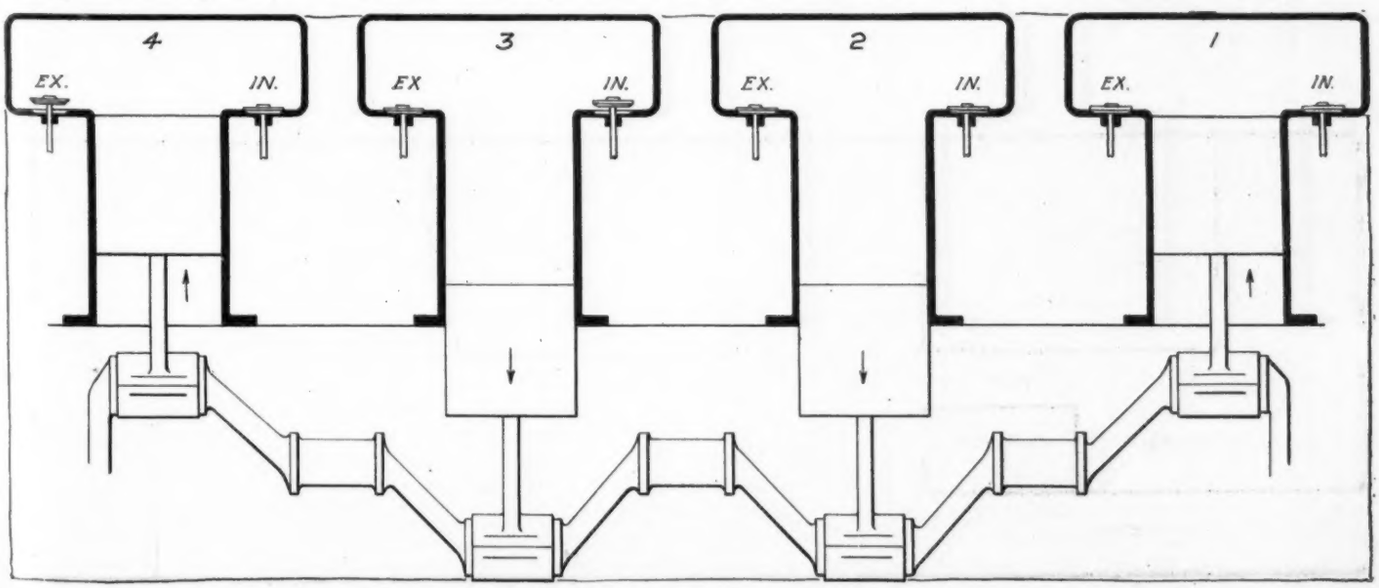
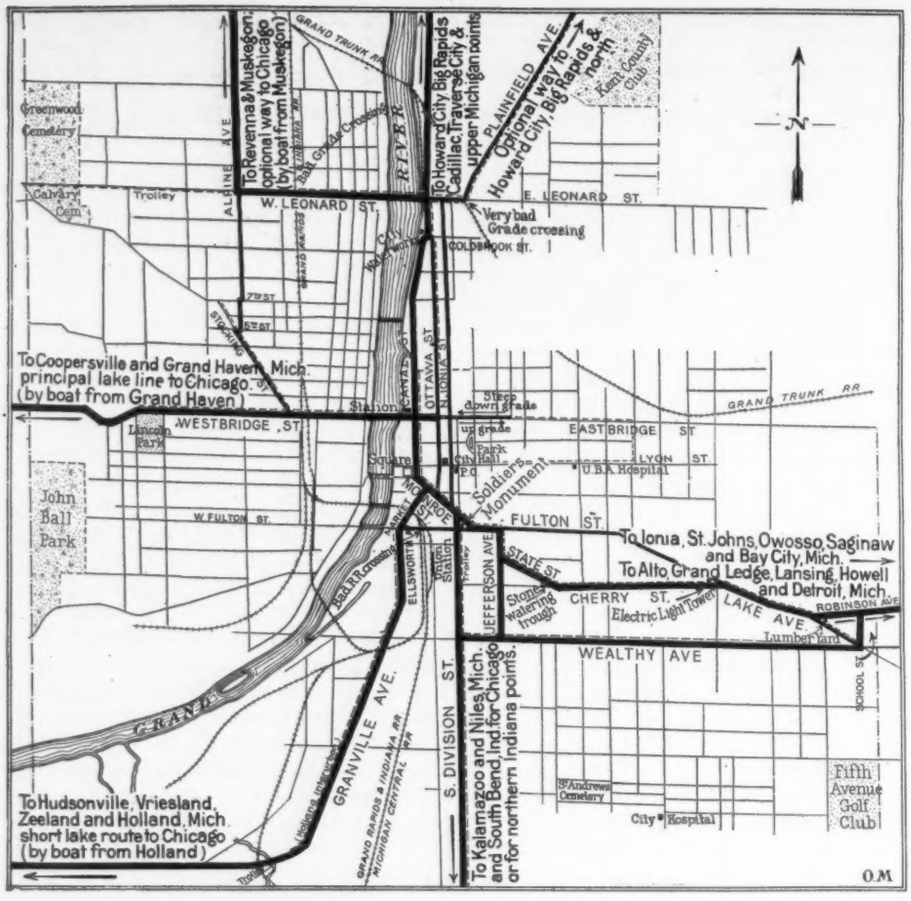


FIG. 2—DIAGRAM ILLUSTRATING THEORY OF BACK FIRING



COPYRIGHTED MAP OF GRAND RAPIDS, MICH. SHOWING ENTERING AND DEPARTING ROUTES, AND TO BE PUBLISHED IN WESTERN BLUE BOOK

garage was charged against them, but being part of the clubhouse the garage shows an annual profit.

On the north side one of the large garages there has a rate of $15 for small runabouts; $18 for small touring cars like the Chalmers-Detroit; $20 for the medium-sized touring cars, and $25 for the seven-passenger machines. This includes washing and polishing. Then there is a sliding scale of $8, $10, $12 and $14 a month for the owner who simply stores his car in the garage, paying $1 for each washing. Dead storage in the winter costs $5 a month, the car being jacked up and the brass protected. This garage does not cover its dead cars, claiming that when a sheet is used the car body gets dusty and damp.

West side rates are a trifle lower if anything for the minimum, although more is charged for the top rate. The scale runs $12, $15; from $15 to $20; from $20 to $25, and $25, $30 and $40, the last named being for limousines. Floor space is rented out at $6 a month for runabouts and $10 for touring cars. The dead storage rate is $3 a month.

One south side garage quotes $20 a month as its minimum, which is for the small runabout. For a rumble-seated or four-passenger car the rate is $22.50, while a small touring car is charged $25. The medium-size pays $30 and the limousines $35. The majority of garage men agree that there is little money to be made out of the garage itself. They depend for their profit upon repair work and the sales of supplies.

USING BATTERY RECHARGER

Martinsville, Ill.—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me if a battery charger—such as the Perfection—installed on a four-cylinder motor to keep storage battery charged to ignite the motor and furnish three lights would be a success? Would this method be more injurious to the battery than charging it in the usual way? Is a Kingston single-vibrator coil and Monitor distributer good equipment for a four-cylinder motor?—L. W.

Several concerns manufacture generators which may be used for ignition and recharging purposes. One of these manufacturers has a device in the nature of a circuit breaker which shuts off the battery charge at certain times. Its outfit consists of a 6 to 8-volt generator with speed governor, an automatic circuit breaker of the polarized magnet type and a set of storage batteries. This circuit breaker gets the batteries in on the small generator when the voltage of the generator comes up enough for charging purposes, excepting that when the battery is fully charged it will not come up until they have become partly discharged. The insulation proposition must be looked into carefully in conjunction with one of these devices. The injury to the battery would be very slight because of this continuous charging. Motor Age is not familiar with the details of the Perfection charger and asks for communications from car owners who have had experience in such practice.

COMPRESSION NEEDED

Editor Motor Age—Will Motor Age, through the Readers' Clearing House, tell me what compression space is required for a two-cycle engine with a 3 by 3-inch bore; also for a four-cycle engine with the same size bore?—Reader.

For a four-cycle engine of this size different compressions can be used. You can have it a low-compression motor, or a high-compression motor. The compression will differ if it is an air-cooled type as compared with a water-cooled. If air-cooled the compression would run as low as 60 pounds for four-cycle work, and for water-cooled four-cycle type it would range from 65 to 75.

DIFFERENCES IN AXLE TYPES

Highland Falls, N. Y.—Editor Motor Age—Through the Readers' Clearing House will Motor Age explain the difference between the floating, semi-floating, dead and live types of rear axles, and also what is meant by each style of axle?—F. E. Brechbiel.

The differences among the four types of rear axles are as follows: A dead rear axle is the kind used on a car with double side-chain drive. This axle is stationary the same as the front axle, the wheels simply rotating on the axle ends as they are driven by the chains from the jackshaft. Floating and semi-floating are live axles, in that the axle consists of a housing or casing inside of which are revolving shafts which at their outer ends attach to the wheels and at their inner ends have gears which receive the drive from the propellershaft, or the single chain, as the case may be. These driveshafts in the axle rotate the same as does the axle on a railroad car, although in a railroad car the axle is not inclosed, as in a motor vehicle. The differences between floating and semi-floating axles were given in these pages May 6 issue.

THERMO-SYPHON COOLING

Argentine, Kan.—Editor Motor Age—Will Motor Age give an opinion on the following: I have a two-cylinder, 24-horsepower opposed engine, located in the middle of the car, and have just put on a new vertical-tube type of radiator of probably 30 or 35-horsepower capacity. The bottom of the radiator is about level with the crankshaft or a little above, and the radiator is about 24 inches high. I am using 1-inch hose pipe from the engine to the radiator and back. Would it be practical to run the engine and expect good results without the pump? I would prefer to run without pump if it would do, as the circulation keeps up when the engine is stopped, if not, and it saves the troubles of a pump.—C. A. Goodrich.

There should be no difficulty in cooling

without the use of a pump, as the motor is located sufficiently low with reference to the radiator and the radiator capacity is sufficiently greater than the rated horsepower of the motor. There are concerns using thermo-syphon cooling where the location of the motor and radiator are practically as outlined in your case, and the systems are most satisfactory for regular heavy work.

REMEDY FOR RUSTY RIMS

Berne, N. Y.—Editor Motor Age—I have noticed several articles in Motor Age lately regarding rusty rims. It seems to me the very simplest remedy would be for the makers to galvanize them. This would not prevent applying paint afterward, but would keep the inside of the rim bright.—W. E. Ayres.

You are right in believing that the simplest remedy would be for the makers to galvanize the rims; and many of them do. But as a coat of tin or zinc is not indestructible, the remedies which Motor Age has suggested, are even adaptable to galvanized rims that have become worn. Some manufacturers of motors are now galvaninzing the inside and outside of the water jackets of the cylinders for the same purpose.

OIL-TESTING DEVICE

Oshkosh, Wis.—Editor Motor Age—Probably the easiest and most satisfactory way the ordinary person can test lubricating oils for cylinders of gas engines to find if there is any inclination for them to leave a residue which will carbonate and foul spark plugs is as follows: Have the engine run until some exposed part of the exhaust pipes is heated to a high degree, then spill a little oil on it. If there is foreign matter in the oil it will be recognized by the showing at once, but if the oil is proper it will only show a greasy film. In fact I have heated an iron surface plate over a clean fire, demonstrating such a test to show the proportions of oil and carbonaceous substance almost as finely and correctly as could be done by chemical analysis. The experiment is so possible under ordinary circumstances that any one should not complain of their spark plugs becoming foul until satisfied from test of this kind that their oil—and what is not now sold as cylinder oil—is the oil to use. This is unattended with any expense and I ask some of my scientifically inclined motor owners to call me down if they try it and it does not prove to be true if they follow the above scheme.—C. B. Hatfield.

CIRCULAR TRACK MILE RECORD

Sacramento, Calif.—Editor Motor Age—I noticed in your issue of April 5, an inquiry from C. W. Maxwell, Roswell, N. M., asking for the time of both gasoline and steam cars for 1, 2 and 5 miles on a circular track, etc. In this instance as in several others that have come to my notice in these columns within the past few months of similar inquiries, I regret very much to note that your answer to the 1-mile circular track record was an error, you stating that 51 seconds made by de Palma at Minneapolis, in a Fiat car being the official record. The object of this letter is for enlightenment. I am and have been for several years under the impression that the 1-mile circular track record was made, and is now held by the White steamer driven by Webb Jay, 48⅘ seconds for the mile. If this is a fact kindly advise how you give the credit to the Fiat for the mile record.—H. H. Derr.

You are correct as to the time made by Webb Jay with a White steamer, but his record was not made on a mile track but on one of greater circuit and so does not stand as a mile record on a mile circular track.

USE OF SLIDE VALVES

Philadelphia, Pa.—Editor Motor Age—Can Motor Age inform me if there has ever been used in this or other countries a system in which incandescent platinum coil and separate ignition chamber with sliding valves are employed? Is such a system practical?—Robert Gibson.

Motor Age has no record of this construction being used for ignition in this or any other country. The small separate ignition chamber has been used by the Mercedes company.

BOOK ON VULCANIZING

Memphis, Tenn.—Editor Motor Age—Through the Readers' Clearing House will Motor Age advise me where I could secure a book on retreading and vulcanizing rubber tires? If unable to give me the name of such a book, will Motor Age kindly give whatever information it can along this line?—Subscriber.

Motor Age has been unable to learn of any standard publication on retreading and vulcanizing tries; but refer you to our issue of April 29, 1909, pages 30 and 31, on which information was given.

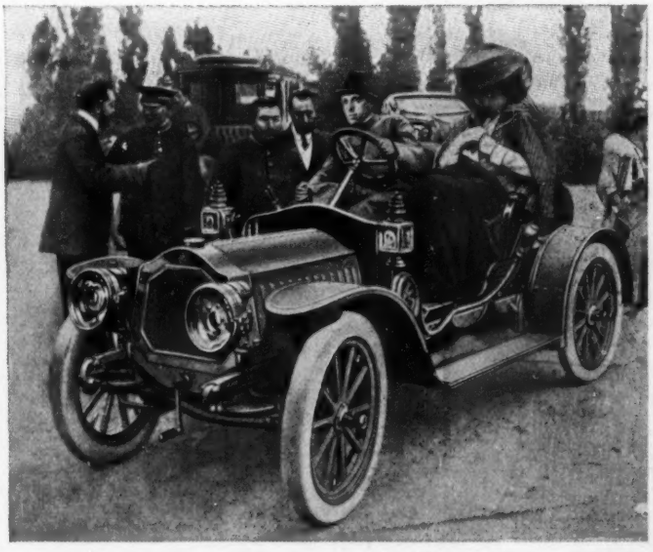
SPANISH ROYALTY MOTORS

Chicago—Editor Motor Age—In Motor Age, issue April 29, I noticed with interest a communication headed "Royalty Fond of Motoring," together with a picture of the king and queen of Italy in their electric car. I am sending Motor Age a picture of the king of Spain at the wheel of his 12-horsepower four-cylinder de Dion-Bouton runabout, accompanied by Queen Victoria. The king of Spain, as everybody knows, is very fond of sports, especially of motoring, and his latest purchase is this runabout.—E. Lescaris.

TEXAS HILL-CLIMB

San Antonio, Tex.—Editor Motor Age—I have not seen in Motor Age any account of our motor tours or hill-climbing contests and am sending, herewith, a photograph of a Cadillac car climbing one of the steepest hills in Landa park, New Braunfield, Tex., in a contest given by the San Antonio club.—W. B. Brunn.

CAR IN HILL-CLIMB AT NEW BRAUNFIELD, TEX.



SPANISH ROYALTY IN DE DION CAR

POINTS CONCERNING DRY BATTERIES

By W. R. Wells

DRY batteries always have been looked upon by a good many people with a certain feeling of distrust. At one time perhaps most of the dry batteries deserved to be considered in this light, and although it still is the case with certain makes, it hardly can be said of all the dry batteries now put upon the market.

Most of the troubles experienced with dry batteries have come from what were seemingly insignificant points: for instance, many of the zinc-containing jars were soldered at the joints with an alloy which was attacked by the active material either more or less than was the zinc, hence local action was set up all along the joints, and the strength of the cell gradually decreased, even though it were standing idle on a shelf. Again, the methods of assembling were apparently very lax. Two cells might be purchased from the same maker at the same time, and yet one would polarize much quicker than the other, thus seeming to indicate that there was either not the same amount of depolarizing material in both cells, or else that it was not placed properly about the carbon in each case. Both of the above faults are of such a nature that they cannot be easily detected from the outside unless tests are made, but at the present day these should not be found in batteries made by reputable concerns.

Abuse of the Batteries

Even assuming that the cells leave the maker in good condition, there are many troubles liable to develop on account of abuse or misuse of the batteries. If the cells are handled roughly, the seals are liable to be cracked. In buying new batteries, this point should be looked after, as a cracked seal or one in which the sealing material—usually pitch—has shrunk away from the joints in cooling, will allow the moisture to gradually evaporte from the active material, and thus make it inactive. The name dry battery leads many people to think that there is nothing but dry material in the makeup of the battery, but this is not the case. The active material is really more like mud or sand from which water has been allowed to drain. It is probable that a very minute crack exists at the edge of the sealing material of the majority of cells, and, although the evaporation allowed thereby is very slow, it nevertheless has its effect, and together with the slight local action which takes place, gradually causes the cell to lose its strength. For this reason, many makers place a date upon each cell, and will not guarantee a battery which has been out more than a certain length of time. If no date appears on the cell, it certainly would be desirable to have the dealer show by meter that the voltage is up to standard, approximately 1.5 volts. A meter test is always desirable, but most especially so in the case mentioned.

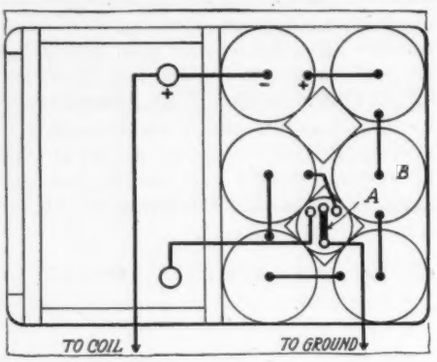


FIG. 1

The manner in which the cells are secured in the car has much to do with their life. Many times they are almost thrown into some space under the seat, where they are free to jostle around and strike the sides of the box or against each other. It does not require a very vivid imagination to realize what the effect is upon the sealing material. In addition to this careless manner of securing, or rather not securing, the cells, the writer has seen cases where bare wire was used for connecting the cells. Under such conditions, it is surprising that the cells gave as good satisfaction as they did, since one or another of the cells was probably short-circuited most of the time.

Cells should always be secured in such a way that they cannot jostle around, and in most cases should not be allowed to come in contact with each other. This is especially true where dry cells and storage battery are both placed in the same battery box. The writer has in mind a car which came from the makers with the batteries as shown in Fig. 1. The battery box was made of metal and given a coating of enamel. There was nothing in the way of a lining between the batteries and the box, and it was not long before the dry cells made contact with the metal of the box. The wires running from the car to the batteries sloped down all the way, with the result that any rain or water which collected on the cable ran down into the battery box. This, together with the acid or fumes from the storage battery, very soon made fairly good conductors out of the paper covers to the dry batteries, and the result was disastrous.

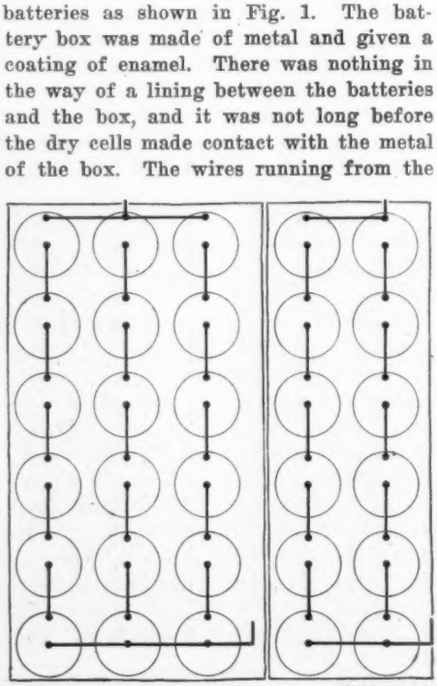


FIG. 2

FIG. 3

Example Is Cited

It should be noted that the positive of the storage battery is connected to the negative of the dry battery, and that when switch A is thrown to the left, where it should be when the storage battery is in use, the negative terminal of the storage battery is grounded or connected to the frame of the car. We thus see that if one of the dry cells, for instance B, is in contact with the metal box and consequently grounded, we have a complete circuit through the storage battery, and the two dry cells between it and cell B. This was what actually happened, with the result that the storage battery was discharged rapidly, while the two dry cells got hot enough to melt the pitch with which they were sealed. Connected as it was, the voltage of the two dry cells was added to that of the storage battery, thus causing an increased current to flow, while if the terminals having like signs had been connected, the effective voltage would have been equal to that of the storage less that of the dry cells in the circuit. As a remedy for this, the makers of the car gave instructions that the connections be reversed, thus running the wire from switch A to the coil and permanently grounding the other lead common to both batteries. To be sure, this cured the trouble as far as the storage battery was concerned, but left the dry cells grounded.

Using a Fiber Lining

It is understood that the makers of this car are now placing a fiber lining in the battery box, thus preventing any contact between the batteries and metal box. This is undoubtedly a marked improvement, but the chances are that the dry cells will still be short lived, since the acid-soaked wooden wedges which separate them will form conductors which, though poor, will partially short circuit the six dry cells and gradually ruin them. To get the best results, the individual cells should be insulated from each other by some water and acid-proof substance. Heavy rubber bands snapped around the cells can often be conveniently used for this purpose.

Where trouble occurs from water following the wires into the battery box, a tight-fitting rubber washer should be slipped over the wires just before they enter the box, thus causing the water to drop off when it reaches the washer.

Many cars which depend upon dry cells entirely for the ignition current, have them all connected in series. In some

cases an extra set is carried as a reserve, but is not connected. A little consideration will show that this is not the way to get the greatest mileage out of the cells.

Since the internal resistance of the average dry cell is approximately .3 ohm, the resistance of six in series will be 1.8 and the C^2R loss—energy—in the cells will be found to vary from one-eighth to more than one-half of the total energy, depending upon the coil and how it is adjusted. If we can reduce this loss in the cells, we will thereby save that much for useful work. If we use two sets and connect them in series-parallel, as shown in fig. 3, it will be seen that for the same total flow of current, the current in each cell will be just half, and since the loss varies as the square of the current, we will have reduced our loss in the cells to one-fourth what it was. Three sets in series-parallel —fig. 2—would cut it to one-ninth, etc.

In addition to getting a much greater mileage per cell while connected in parallel this way, when the voltage drops to an undesirable point, the arrangement of the connections may be changed so that there are fewer parallel paths but more cells in series until eventually all cells are in series. In this way the cells may be used until the voltage has dropped exceedingly low per cell. It is also true that until all of the cells have been placed in series, there has been little need for extra or relay cells.

At one time, some of the makers put forth the claim that their dry cells could be recharged the same as a storage battery. This is true to a certain extent, but the energy which can thus be put into any that the writer has ever tried is not worth the trouble, and few makers now lay any stress upon this claim. If, after a dry cell has served its ordinary life, the owner considers it worth his time, he can often get further use out of it by removing the seal and saturating the contents with sal ammoniac solution. Sometimes the zinc container is punched full of holes and then the entire cell set inside a glass jar filled with the solution. Of course these rebuilt cells are only fit for stationary work.

In cases where the batteries have failed because the seal has not been tight and the moisture has evaporated from the active material, the writer has prolonged their life by breaking out a portion of the pitch, adding all the water that the cell will absorb and then resealing with the aid of a hot poker.

Dry batteries should not be allowed to get too cold, as the writer has known them to freeze hard enough to burst the containing zinc. Even though no permanent injury may result, it will be found that the voltage is much reduced. During a recent cold snap, the bell battery at the writer's home apparently reached this stage, as the bell refused to ring until warmer weather returned, but then resumed its regular duties.

Motorists' Book Mart

The most pretentious publication yet issued in America on the subject of motoring is the American Cyclopedia of the Automobile, a six-volume compilation arranged alphabetically by Thomas H. Russell and Charles P. Root, and published by Thompson & Thomas, Chicago and New York. In all 2,128 pages of matter and illustrations pertinent to motoring are included and arranged in regular cyclopedic form. The several volumes treat or give information on the different parts of motor cars, the care each should receive, different motoring organizations, different instruments used in conjunction with motoring, various types of construction of car parts; and in volume 6, which is not arranged alphabetically, is a complete history of motoring in America, covering the different road races, track races, hill-climbs, and other contests. The last third of this volume is devoted to a series of questions and answers on points relative to motoring. The conception of this cyclopedia is a most meritorious one, but the six volumes give evidence of too great haste in compilation in places, and in other places the information is not so explicit as might be expected. The information has been compiled from the various foreign and American authors who have text books bearing on different phases of motoring, from different trade publications, etc., credit being generally given wherever information is obtained from such sources. A few examples from the different volumes will serve to illustrate the general scope of the work:

Angle iron—a rolled or wrought bar of iron in the form of an angle used in iron construction. When made in the shape of double angles it is called a channel iron.

Case hardening—To carbonize the surface of an iron or mild steel by moderately heating it in contact with charcoal or charred animal matter in a case or closed box followed by rapid cooling; to superficially coat with hard steel by any process of cementation.

Resilience—The act of springing back; elasticity or a rebounding after the removal or cessation of a deforming force, also a mechanical work done by a body in springing back.

Self-starter—An automatic starting device or apparatus to enable the driver to start his engine from the seat. Several types are on the market, some using compressed air and compressed gas charges, others operating by means of a coil spring.

Self-ignition—The ignition of the charge in a cylinder by some other means than that of the spark. Usually caused by red-hot soot or great heat in the cylinder.

In Vol. I, forty-four pages are devoted to carbureters, in which the majority of the American types are illustrated and described. Under the head of "Care and Management" are forty pages on the care necessary in the different parts of cars. In the department headed "Change-Speed Gear" are forty-six pages in which many types of gears are illustrated, and the operation of the different types explained. Twenty-six pages are devoted to clutches, in which the several types are illustrated and briefly described. Under the head of "Driving" are eighty pages containing instructions on speed changing, skidding, handling of the car, etc. Some of this information applies to foreign as well as American cars. Under the head of "Ignition" are 150 pages, in which the magneto, induction coil, and wire systems are explained. The internal combustion engine is treated in forty pages. Under the heading of "Repairs and Adjustments" are 158 pages, taking up the possible troubles that arise in conjunction with the different systems of motor cars and the method of correcting them. Under the head of steam cars is the complete description of the White steamers, as published in a trade paper, credit being given.

For the amateur motorists there is a great deal of information in the volumes relative to the handling of his car, but for the student, who wants to delve deeply into the different aspects of a motor car, they are not quite so beneficial. The majority of the illustrations are those used by manufacturers in their regular literature, with the exception of those taken from other publications and which are used to explain principles of construction or operation.

Cyclopedia of Automobile Engineering

The American School of Correspondence, Chicago, has published a four-volume cyclopedia containing 1,444 pages. The matter is not arranged alphabetically in cyclopedic form, but in chapters under different heads. Vol. I Part I deals with the gas and oil engine for stationary as well as motor car work. Part II treats on gas and oil engines, the majority of which is not of direct interest to motorists. The next division is on gas producers, which does not have any direct bearing on the motor car. Department IV is on heat, including a series of questions involving problems on heat, etc., being more of a text book than applying to motoring. The next department is on mechanics. The information throughout is excellent but irrelevant. Vol. II opens with magnetism and the electric system, but devotes the majority of the space to electric generators of the direct and alternating-current type, which is not of interest to motorists. A useful chapter in this volume is that on storage batteries. Vol. III takes up an analysis in 203 pages of the motor car, all of which information is of direct value. Following this is a short chapter on motor cycles, and the remainder of the volume is devoted to machine-shop work and is of standard text book variety. Vol. IV is devoted exclusively to steam, going into stationary and power work rather than the steam motor car as it exists today.

From the Four Winds

N S E W

Oregon's Strength—Three hundred and one motor car and motor cycle licenses have been issued in Oregon from January 1 of this year to April 23, according to the records on file in the office of the secretary of state.

Kokomo To Celebrate—The sixteenth anniversary of the completion of the first motor car will be celebrated in Kokomo, Ind., on June 2. A program of races and a parade will be arranged and drivers from all parts of the state asked to participate. The first Kokomo car, it will be remembered, was made by Elwood Haynes and is now on exhibition in the Smithsonian Institute, Washington.

City Garage at Toledo—The city cars of Toledo are to have new quarters built especially for their accommodation. All this because when it was learned that the city machines were being kept in the street department barns every insurance company carrying risks on the barns proceeded to raise the insurance rates 10 per cent. The city authorities refused to stand for the increased rate and the new barns represent the compromise arranged.

After Scorching Motormen—For a long time complaints have been coming in to the officials at Findlay, O., in regard to the rapid running of electric cars, but it was difficult to secure evidence to convict the guilty crews. Last week Chief Kramer had an idea. He secured a motor car and met the limited car at the north end of the city limits. When the race was over the motor's speed indicator showed that the car was running at the rate of 38 miles an hour. In a similar manner motormen on the Western Ohio were caught running their cars at the rate of 45 miles an hour. The motormen were arrested and paid fines for their violations of the city's speed ordinance.

Missionaries Want Motors—"Motor cars should be a part of the equipment of our missions in India," was the declaration of Dr. Winifred E. Huston, of Bombay, India, at the twenty-eighth annual convention of the Women's Presbyterian Board of Missions of the Northwest, in Milwaukee, Wis. "When I return to India I shall take a motor car with me, for I know that it will not only prove of great assistance in the mission work, but it will save many lives. Much suffering could have been avoided had our missions been so equipped before. I cannot estimate how much more good I might have accomplished had I had a car at my disposal before. Long trips must be made every day. Most of the roads are built by the English and are good for the use of machines. They would be invaluable for the work of our physicians. Most of the mission posts have no physicians, and it often takes a day or more before attendance can be had."

Ferguson a Hower Aide—E. L. Ferguson, widely known as a designer and writer on motoring topics, has accepted the appointment of secretary to the contest board of the A. A. A., and is now making his headquarters at Buffalo.

Will Examine Tires—The committee in charge of the 3-day Catskill-Berkshire tour, under the auspices of the New York Automobile Trade Association, on June 12, 13 and 14, has announced a novel tire and demountable rim competition to be held in conjunction with the tour. Observers appointed by the tire companies interested will report on the condition of each individual make upon reaching the different controls.

Keeps Children off Streets—Motor car drivers of Greensburg, Ind., are urging the council of that city to pass an ordinance which has aroused the ire of less fortunate citizens who do not motor. They want an ordinance making it a misdemeanor for boys and children to play in the streets, and the proposal is receiving much serious consideration. It is believed that if the streets are kept clear in this manner, there will be less danger of accident.

Massachusetts Speed Traps—Notices have been posted warning members of the Worcester Automobile Club, of Worcester, Mass., of traps in and around Worcester and eastern Massachusetts. Among the traps are a photograph trap established on Commonwealth avenue, Beacon street and the Fenway, in Boston, where pictures are taken by the police showing the condition of travel at the time of the arrest; Wellesley Hills square, Main street, Waltham; the principal streets entering Fall River; in Swansea on the road between Providence and Fall River; Middleboro, where banners have been hung by the selectmen warning the drivers.

Helps the Owners—After a lengthy litigation before the Ohio railway commission, State Superintendent Fred H. Caley, of the motor car department secured a decision which will be quite a saving to the state and also aid in securing members for the various motor clubs of the state. For some time the express companies refused to receive shipments of tags except in separate packages. Mr. Caley has been in the habit of sending a score or more tags by express to the clubs in Cincinnati, Cleveland, and other cities, and from that place they were distributed to the members. This served to save money and to bring the owners in closer relationship to the clubs. By the decision express companies are compelled to accept shipments of large numbers of tags in one package to clubs.

Owners Raise Road Fund—Motor car owners of Wichita, Kas., will contribute to a fund for the macadamizing of Murdock avenue from Main street to Waco avenue, which will provide an excellent road to Riverside park.

Kearney Enthused Over Glidden—Elaborate preparations are being made at Kearney, Neb., in anticipation of the coming of the Glidden tourists in July. The city will be decorated profusely; 150 owners have signified their intention of meeting the tourists, and the four garages of the city are making preparations to care for the machines should they come this way.

Packard Output Completed—The accompanying picture shows the testing corps of the Packard Motor Car Co., the members of which have driven Packard cars an aggregate of 1,000,000 miles, or forty times around the word, without any serious accidents or incurring the ill-will of the citizens and officials of Detroit. They are happy in the picture because they have just finished putting their mighty O. K. on the last of 2,300 1909 Packard motor cars—9 days ahead of schedule.

Parade for Indianapolis—Mayor Bookwalter is planning a municipal parade for Indianapolis for the first week in June, to show the progress the various departments have made during his administration. One of the features will be the fact that the municipal motor cars will lead the procession, all of which have been purchased during the present administration. These include four cars owned by the police department; two by the fire department; one by the street commissioner; one by the city engineer; one by the board of public works and two by officials of the city board of health.

On to Yellowstone!—A subscription list of $4,500 has been raised by public-spirited citizens of Lander, Wyo., and its vicinity and work begun on the motor road from Lander to the Yellowstone park. The road, which will be 60 feet wide, with drainage on each side, will be a part of the trans-Wyoming highway. Half a mile of the road was completed but bad weather interfered and it was stopped for the present. The work of extending the highway across the Indian reservation will be taken up at once by a band of Indians, and it is expected that by the first of July the road will be finished as far as Dubois. By the completion of this highway there will be practically two highways into the famous Yellowstone park, the other being that of the Wyoming Auto

Transit Co.'s line a little to the west of the one now building. The new Lander road has a southern terminus with the former, several miles north of Rock Springs.

Road Race for Georgia—Word filters up from Fitzgerald, Ga., now and then about the road race which will be held there June 16 and 17. Work has already been started on an 8-mile road course, which citizens of that flourishing dot upon the map state will quite equal the Savannah course, as far as it goes.

Bay States After Entries—The Bay State A. A. is hustling to secure entries for its race meet at Readville, Mass., on June 17. Arrangements are under way to secure a special match race between dePalma and Basle. The racing committee has invited Harry Knights to act as its referee, and prominent motorists from other clubs in the state will be asked to be judges.

English Try Air-Cooling—English manufacturers are at last turning their attention toward air-cooling for engines and its consequent advantages. The latest introduction in this line is a system in which the ordinary waterjackets are drilled with a number of small holes, the ordinary waterpipes are removed and larger ones instituted. Through these pipes an exhaust injector drives a blast of air. The cylinder head is furthermore covered with a patent substance having a very high radiating capacity. The scheme has been tried on an old Mercedes engine and found to give excellent results under a prolonged brake test.

Favors Convict Labor—Governor Crothers' proposed plan to have convicts build the Maryland state roads has brought forth favorable comment from various section of Maryland. Warden Hook, of the city jail, expresses the sentiment of many Marylanders in this matter. He says: "The system of employing convicts on the roads could be used as successfully in Maryland as in Virginia. In the latter state the convicts are building macadam roads at about $3,500 a mile. This is less than half the cost of macadam roads under ordinary conditions. The prisoners should be worked in gangs. They cannot be scattered about too much, for this would necessitate too many guards. But by picking the men and working them in gangs there need not be much cause for trouble."

British Club Deficit—There is considerable dissatisfaction among a goodly number of the 4,000 members of the Royal Automobile Club of Great Britain that there should be a deficit which amounts to $21,470. The membership fees brought into the club last year $110,420. The loss comes from the club's journal, which for the past year showed a deficit of $20,865. The circulation of the journal is stated to be 14,193 copies weekly.

Governor Not Exempt—Governor Judson Harmon, of Ohio, is not exempt from the operation of the Ohio state law. This is shown by the fact that his excellency was compelled to secure a duplicate set of tags for his new car. Several weeks ago he took out his license and was given the tags, which his chauffeur immediately lost. Upon several occasions when his machine was stopped by the police the statement of his chauffeur that the motor car belonged to the governor had the effect of staying the stern hand of the law. Finally one of the guardians of the peace was not moved by this statement and new tags had to be secured or the driver would have been sent to jail.

Milwaukeeans Are Busy—"We have been so busy in considering the clubhouse proposition that we have not been able to devote any attention to contests, tours and road runs," says Arthur C. Brenckle, secretary of the Milwaukee Automobile Club. "We are now negotiating with the Wisconsin state fair board of managers for a race meet in September. I hardly believe that we shall hold a 24-hour contest this year, as we have for 3 years past. We had intended holding a hill-climb before now, but legislative matters and the clubhouse proposition are taking all of our time. There are so many new clubs springing up about the state that have asked us to institute them into the Wisconsin State A. A. that it is certain that the club will make at least six and possibly a dozen long tours this summer. These are probably the most interesting features of our organization, and cannot be overlooked. We are also making great preparations for the Glidden tourists, who, while they cannot stop with us long, will get one of the best receptions here of any stop along the route, unless our plans go awry."

Hotchkiss For Governor—At a recent meeting of several prominent citizens of Depew, N. Y., a boom was started in favor of having William H. Hotchkiss become a candidate for the office of governor of New York state. Mr. Hotchkiss recently resigned from the presidency of the American Automobile Association after he had been appointed state superintendent of insurance.

May Postpone Hoosier Run—It is likely the annual endurance run of Indianapolis tradesmen to French Lick and return will be postponed until some time in June. The hotel keepers at the southern Indiana resort have stated they will be better able to care for the visitors in June than during the latter part of May, and their advice will be acted upon by the Indiana Automobile Club, under whose auspices the run will be made.

New Railroad Rates Planned—The motor car business on Nebraska railroads is increasing so rapidly that a new series of rates will probably be promulgated shortly, these rates particularly covering the movement of special motor cars. At present the rate for special trains is $1.50 per mile with a minimum fixed on passengers. Single motor cars, requiring a smaller crew, can be run on special order at a less rate than this.

Italian Military Trial—A severe endurance test was recently held in Italy which was promoted by the military department of Italy for the purpose of ultimately purchasing three vehicles for army service. Fourteen cars—five Fiat, three Itala, three S. P. A., two Rapid and one S. C. A. T.—took part in the run, which covered a distance of 134.9 miles with loaded cars at an average speed of not less than 20 miles per hour. All the cars accomplished the task, a 20-30-horsepower Fiat, driven by Bordino, making the fastest time, 4 hours 19 minutes. An Itala with Cagno at the wheel was second in 4 hours 30 minutes. Officers from the general staff followed the trials.

PACKARD TESTERS CELEBRATING COMPLETION OF COMPANY'S 1909 OUTPUT

ELECTRICAL DEVICES USED IN MOTOR CARS

By Thomas J. Fay
Part VI

MAGNETICALLY, there are various details coupled with extremely important principles to be taken into account, in which a certain exactness is of the greatest importance if the results are to be good. Fortunately, the principles of magnetism are as an open book, and all that is necessary is to follow the well-known laws to certain success. On the face of it the situation looks a little complicated, but a little study will result in a clear state of the art and the reader will be much surprised at the simplicity of the whole plan.

Take, for illustration, the force which accounts for the presence of what is known as magnetism—flux of the magnetic force. This magnetomotive force is analogous to electromotive force in an electrical circuit, and the resultant magnetic flux is analogous to current in the electrical circuit. Obviously, if a force is necessary to impress a current, be it electrical, hydraulic or magnetic, there must be a resistance to overcome. In an electrical circuit the resistance in ohms is overcome by the electromotive force in volts, and a current in amperes is set up in the circuit as a sequence.

Resistance to Magnetic Flux

In a magnetic circuit the resistance to the magnetic flux is designated as reluctance and is measured in orsteads. The magnetomotive force is measured in gilberts, and the total of the magnetic flux is measured in webers. There are other magnetic phenomena that will be taken up at the proper time.

Between the electrical and the magnetic circuit the analogy, which is present, may be expressed as follows:

In the Electrical Circuit	In the Magnetic Circuit
$E = I\ R$	$G = W\ O$

when,

E = electromotive force in volts = unit of pressure,

G = magnetomotive force in gilberts = unit of pressure,

I = current in amperes = unit of density,

W = magnetic flux in webers, unit of density,

R = resistance of the electrical circuit in ohms,

O = reluctance of the magnetic circuit in orsteads.

As will be observed, the similarity is both in point of result and as respects the algebraic expressions. This same principle extends all through scientific methods of estimating magnitudes. To illustrate: In referring to energy, it is proper to say that a weight falling through a vertical distance, will deliver energy on a basis of foot-pounds. In this, the vertical height is representative of the potential and the weight—mass—represents the current or the flux.

A weight, elevated to a height, is possessed of energy of position, and it represents a potential force, called by whatever name, just as an electromotive force is set up in an electrical circuit, or a magnetomotive force is impressed in a magnetic circuit. The force is always acting, and the product of the force depends upon the resistance of the circuit, orbit, or whatever may be the medium through which it acts.

In an Electrical Circuit	In a Magnetic Circuit
$I = \frac{E}{R}$	$W = \frac{G}{O}$

when,

I = density of the current in amperes in an electrical circuit,

W = total of the magnetic flux in a magnetic circuit,

E = electromotive force in volts, in an electrical circuit,

G = magnetomotive force in gilberts in a magnetic circuit,

R = resistance in ohms of an electrical circuit,

O = reluctance of a magnetic circuit in orsteads.

Following the line of reasoning set forth for the electrical circuit, in which it was stated that the current in amperes is equal to the electromotive force in volts, divided by the resistance in ohms, there is for the magnetic circuit the magnetic flux in webers, which is equal to the magnetomotive force in gilberts divided by the magnetic reluctance in orstead:

In an Electrical Circuit	In a Magnetic Circuit
$R = \frac{E}{I}$	$O = \frac{G}{W}$

when,

R = resistance in ohms of an electrical circuit,

O = reluctance in orstead of a magnetic circuit,

E = electromotive force in volts of an electrical circuit,

G = magnetomotive force in gilberts in a magnetic circuit,

I = density of current in amperes in an electrical circuit,

W = magnetic flux in webers in a magnetic circuit.

In an electrical circuit then, the resistance in ohms is equal to the electromotive force in volts divided by the current in amperes, and in a magnetic circuit, the reluctance in orstead is equal to the magnetomotive force in gilberts divided by the magnetic flux in webers.

Flux Density in Magnetic Circuit

In an electrical circuit it is sometimes desirable to take note of the current density per unit of section of the conductor; in other words, it is possible to say that the current is a certain number of amperes per square inch of section of the circuit. In a magnetic circuit it is more necessary to utilize this method of referring to the magnetic flux, and the unit of flux density has been given a name. The gauss is the unit of flux density in a magnetic circuit, and it is equal to 1 weber per square centimeter of the magnetic circuit, measuring at some point in the circuit that is representative of normal conditions. The gauss, then, is equal to the weber, for a section of 1 square centimeter of a circuit, and the webers in a circuit are equal to gauss × square centimeters, considering the whole section of the magnetic circuit, and normal density of the same.

Some Short-Cuts in Practice

In actual practice the magnetomotive force of a magnetic circuit is due to a current in amperes embracing the circuit,

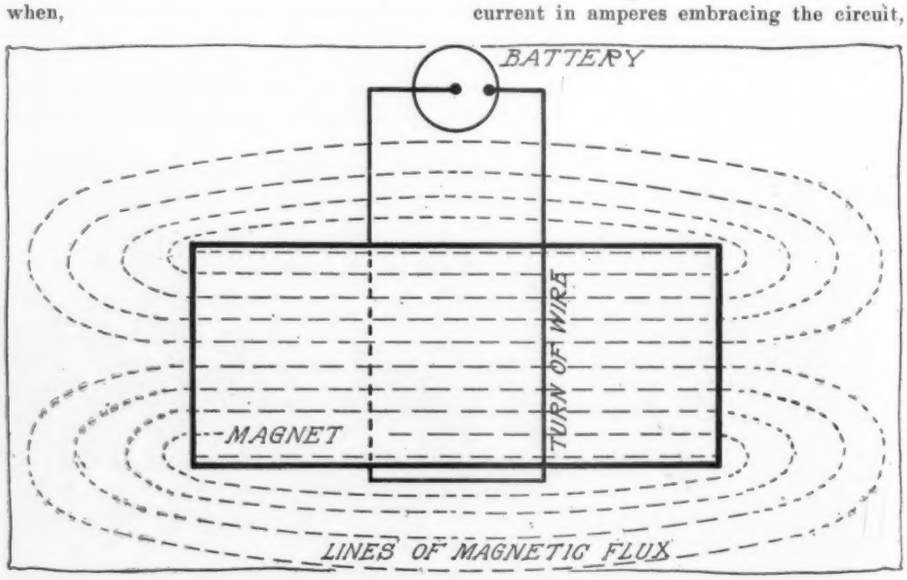


FIG. 12—MAGNETIC LINES OF FLUX

and 1 ampere of current circulated once around the magnet is equal to 1 ampere-turn of magnetomotive force. Fig. 12 shows a magnetic core around which one turn of wire is wound, and if the resistance of the wire is 1 ohm, provided the battery electromotive force is 1 volt, the current will be 1 ampere. One ampere of current in the circuit for one loop around the core makes 1 ampere-turn of magnetomotive force. With the same current in amperes, if the wire is increased to two turns, there will be double the magnetomotive force in the same magnetic circuit and in fine, amperes of current in the turns of wire, multiplied by the number of turns of wire, equals the magnetomotive force of the magnetic circuit.

In general, and in line with what has been stated, the magnetomotive force, or magnetizing power of an electro-magnet, is proportional to the turns of wire and the current in amperes flowing through them. This same magnetomotive force relates to the C. G. S. system in the manner as follows:

Let,

n = number of turns of wire,

I = intensity of current in amperes in the wire,

$$1.257 = \frac{4\pi}{10} = \text{a constant, used to reduce to the C. G. S. system,}$$

then,

$F = 1.257 \times n I =$ magnetomotive force.

The unit of magnetomotive force, the gilbert, is equal to:

$$G = \frac{10}{4\pi} = \text{the magnetomotive force in ampere turns multiplied by the constant .7958,}$$

which constant is derived in the manner as follows:

$$.7953 = \frac{1}{1.257}$$

Older Method Is Favored

It follows that the ampere-turns required in a given case, will be equal to the magnetomotive force in gilberts, divided by .7957. Or, in general, it is just as accurate to figure the magnetomotive force in ampere turns without reducing to gilberts at all, and many designers use this older method in regular practice.

Referring again to Fig. 12, note that the magnetic circuit is in air excepting for the part that traverses the core. In magnetic, as well as in electric circuits, the paths can be of any number of separate reluctances or resistances as the case may be, and the sum of the reluctances —called resistances in electrical circuits— will be the reluctance of the circuit as a whole. In electrical circuits, the conductivity, as measured in ohms, was said to be equal to the reciprocal of the resistance in ohms; in a magnetic circuit, the permeability is analogous to conductivity in an electrical circuit, and this permeability is equal to the reciprocal of the reluctance.

Limiting Influence of Reluctance

In air the limiting influence of reluctance in orsteads, is great, as compared with the reluctance of iron, or steel; it is also true that the reluctance of the several grades of iron changes over broad ranges. The standard of magnetic reluctance is a cubic centimeter of an air-pump vacuum; it is not uncommon to say that the reluctance of air is unity. Obviously, this statement is not quite accurate, since the standard refers to such a vacuum as can be produced by an air-pump; the error is not so great as to introduce a great difference in the ultimate results, when nearly the whole circuit is in iron or steel.

In the magnetic circuit, Fig. 12, in view of the reluctance of air, which is high, a stray field of force will be present, in that all the magnetic flux will not emanate from the ends of the core of the magnet, and as a result, the flux density of the core will not be the same at all points in the section. The flux density in gauss then will be a maximum at a point half way between the two ends of the iron core and in view of the limited ability of the iron core to propagate magnetism, since the iron ultimately becomes saturated, the greater is the magnetomotive force in gilberts, the greater will be the stray field, and the greater will be the gauss variation, in the core, from the center, outward, in both directions. Fig. 13 shows in a general way, the effect of this magnetic leakage, in which the magnetism is represented by lines, all of which pass through the iron core for as much of the whole length as is represented by A A′ and B B′. Outward, from A A′, at one end, and from B B′ toward the other end, the magnetism deflects, forming a shorter circuit than that which would follow were all the lines to pass through the ends of the core and return the whole distance in air.

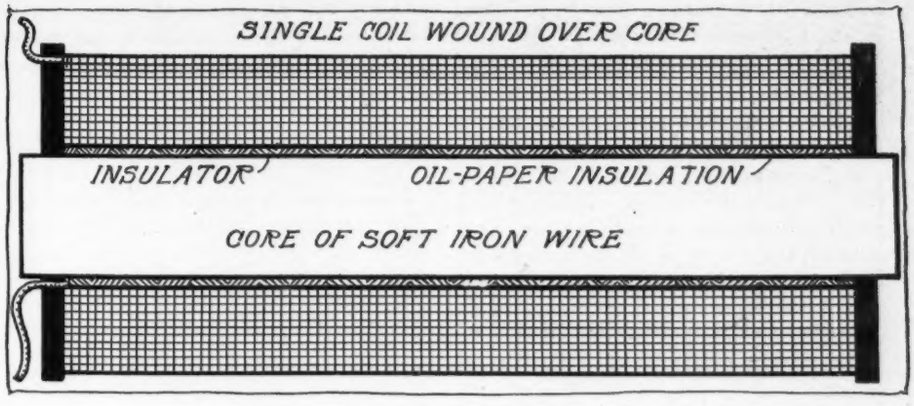


FIG. 14—SECTION THROUGH ORDINARY INDUCTION COIL

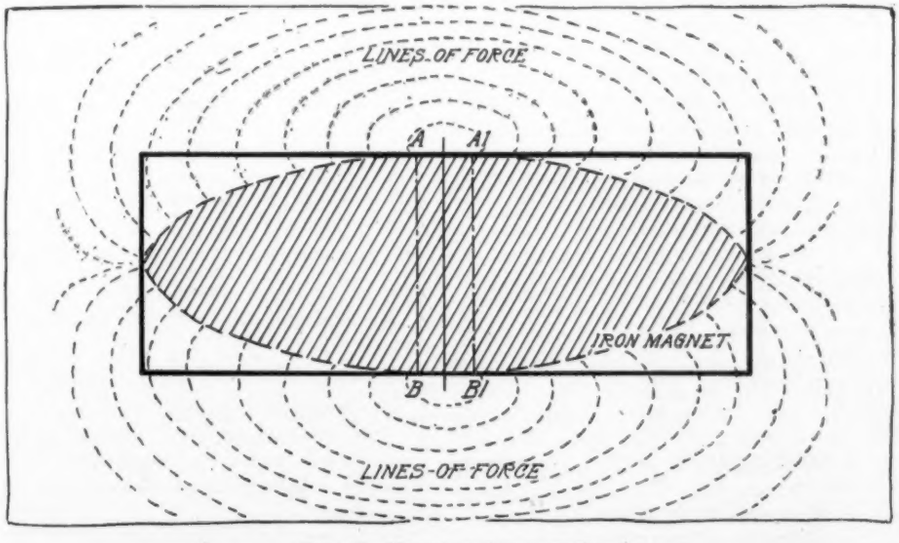


FIG. 13—MAGNETIC LINES OF FORCE

Induction Not a Maximum

Fig. 14 shows a core wound with wire, in the manner usual to an ordinary induction coil and in the absence of any magnetic leakage the induction would be that due to the magnetomotive force multiplied by the reluctance of the circuit. In view of the short-circuiting effect, which produces the stray magnetic field, as shown in Fig. 13, the induction is not a maximum, and the turns of wire on the core, Fig. 14, will not all serve as loops for the same value of the magnetic flux in webers. As a result, the induction will be diminished, in percentage, as much as the percentage change in flux, due to magnetic

leakage, which leakage in turn, increases as the flux density in gauss is increased, due to the ability to saturate an iron core.

The Influence of Saturation

As magnetism is increased in density in an iron core, the reluctance of the core increases, but not in direct proportion. This is one of the reasons why, in magnetic work, the problem is more complicated than it is in ordinary electrical work. In the electrical problem, a circuit can be well insulated, so to speak, which is another way for saying that the conductivity of the insulators is very low, in comparison with the conductivity of the conductors. In magnetic work, the difference in reluctivity, as between air and the best magnetic circuits, as soft annealed Swedish iron, is not so great as to assure the absence of magnetic leakage, which is at the bottom of what is designated as the stray magnetic field. There is no material better than air for use in insulating magnetic fields so far discovered, and so it happens that a certain amount of magnetic leakage must be tolerated.

Limiting Magnetic Leakage

How to put a limit on this magnetic leakage is one of the problems to be coped with and the one best way is to provide a complete magnetic circuit of such iron as will prove of the greatest permeability and with the section of the magnetic core so great that the flux density in gauss will be a minimum. It frequently happens that the one best way does not lend itself to a plan, and in spark-coil work, for illustration, it has not been found that the closed magnetic circuit is the best for the purpose. Before going into this phase of the subject, however, it will be of advantage to discuss the magnetic qualities of iron and steel, as used for magnets, in order to more clearly understand the situation when it does become necessary to deviate from an apparently right path, to accomplish a special purpose.

It has been shown that the reluctance of a magnetic circuit, as measured in orstead, is equal to the magnetomotive force in gilberts divided by the magnetic flux in webers. In a circuit, having for its dimensions, a centimeter cube, in an atmosphere such as can be produced by a vacuum air-pump, it is accurate to say that the weber and the gauss will have the same value considering a centimeter cube; and what is really wanted is the values for reluctance for changing values of flux density in gauss, which will afford a measure of the magnetic flux in webers, under the conditions as mentioned.

Magnetic Values Tabulated

In order to be able to show the relations, a particular specimen of steel will be taken, and all the magnetic values will be tabulated for this especial specimen. There is a wide range of changing values in the several grades of steel and iron, and in this is ample opportunity for mistakes. The values for the given sample of steel are shown in one of the tables:

Magnetic properties of a certain specimen of steel:

A Magneto motive force	a Magneto motive force	B Magnetic flux density	C Magnetic reluctance	D Magnetic permeability
3.38	2.68	5,240	0.000517	1,540
6.50	5.17	9,270	0.000560	1,425
13.40	10.66	13,100	0.000815	978
20.40	16.23	14,590	0.001310	607.5
25.90	20.61	15,130	0.00136	585
30.50	24.27	15,650	0.001554	513
37.60	29.92	15,880	0.00188	422.5
47.80	38.03	16,220	0.00234	340
55.50	44.16	16,630	0.00265	300
72.60	57.77	17,120	0.00337	236

A—The magnetomotive force is given in ampere-turns per centimeter length of the magnetic circuit;

B—Flux density in gauss per square centimeter;

C—Magnetic reluctance in orsteads;

D—Magnetic permeability = reciprocal of the magnetic reluctance;

a—Magnetomotive force in gilberts. This column is calculated in the manner as follows: G = ampere-turns × 0.7958.

Calculating Permeability

In any magnetic material of a character to afford uniform magnetic properties it is always possible to calculate for permeability on the one hand, and reluctance on the other, if the flux density in gauss is known for any given magnetomotive force in ampere-turns, or gilberts, for any given condition of saturation, but it is best to ascertain the flux density at different states of saturation, and in this way, learn the nature of the material, the maximum flux density possible and in this way find out when it is of no further practical value to apply magnetomotive force. In the table it will be observed that the flux density in gauss does not increase in direct proportion to the exciting power in gilberts, for, as an inspection will readily disclose, with an exciting power of 10.66 gilberts the flux density is 13,100 gauss, and with an exciting power of 57.77 gilberts the flux density was but 17,120 gauss. Plainly, as the table shows, the steel was in a near state of saturation with the higher magnetomotive force, and in ordinary practice it would be right to work the steel on a basis of about 10 gilberts magnetomotive force, realizing about 13,000 gauss as the flux density.

The materials show very good magnetic properties, and it is not possible, under ordinary conditions, to procure such good material for the purpose. A fine grade of gray cast iron, for illustration, would afford magnetic properties about as follows:

A Magneto motive force	B Magnetic flux density	D Magnetic permeability
5	4,060	800
10	5,000	500
21.5	6,000	279
42	7,000	133
80	8,000	100
127	9,000	71
188	10,000	53
292	11,000	37

A—Magnetomotive force in ampere-turns;

B—Flux density in gauss;

D—Magnetic permeability.

Even when the steel is taken from the same heat, in the process of manufacture, there will be a difference in the magnetic properties of the respective samples; in different heats if the composition of the steel changes very much the magnetic properties will be very different. To show the differences likely in different specimens of the same heat of steel the values are given in one of the accompanying tables:

Magnetic properties of different samples of the same steel.

A Magneto motive force	B Magnetic flux density	A Magneto motive force	B Magnetic flux density
3.46	5,240	3.44	5,475
6.54	8,330	6.63	8,710
13.45	12,720	13.63	12,280
20.25	14,340	20.80	13,840
26.05	15,060	26.15	14,550
30.45	15,500	30.80	15,050
36.85	15,670	37.35	15,280
48.40	16,180	48.70	15,850
55.75	16,630	55.90	16,220
73.40	17,040	74.10	16,880

A—Represents magnetomotive force in ampere-turns;

B—Flux density in gauss.

A comparison with the magnetic values given for steel will disclose a very great difference, as between it and the values for cast iron as above disclosed. As a matter of fact, cast iron, however good the brand, is not a good magnetic material to use, and even steel is not the best for the purpose. Annealed wrought iron is far more valuable for the purpose, and for that matter, there are great differences in this product, not only as respects the source of supply, but due to process of manufacture, alloying, etc. In modern work vanadium is used as an alloying element, and it is claimed that the hysteresis factor is very low in this iron. This question of hysteresis will be taken up and discussed at some length, due to the influence of hysteresis on magnets, especially in ignition work. In the meantime it will be the purpose to give values for wrought iron as a magnetic material, quoting Hopkinson for the purpose, as follows:

Magnetic Properties of Wrought Iron

A Magneto motive force	B Magnetic flux density	D Magnetic permeability
2	5,000	2,500
4	9,000	2,250
5	10,000	2,000
6.5	11,000	1,650
8.5	12,000	1,412
12	13,000	1,083
17	14,000	823
28.5	15,000	526
52	16,000	308
105	17,000	161
200	18,000	90
350	19,000	54

A—Magnetomotive force in ampere-turns;

B—Magnetic flux density in gauss;

D—Magnetic permeability.

This table shows that wrought iron is considerably better for magnets than steel castings and very much better than cast gray iron.

(To be continued.)

The Motor Car Repair Shop

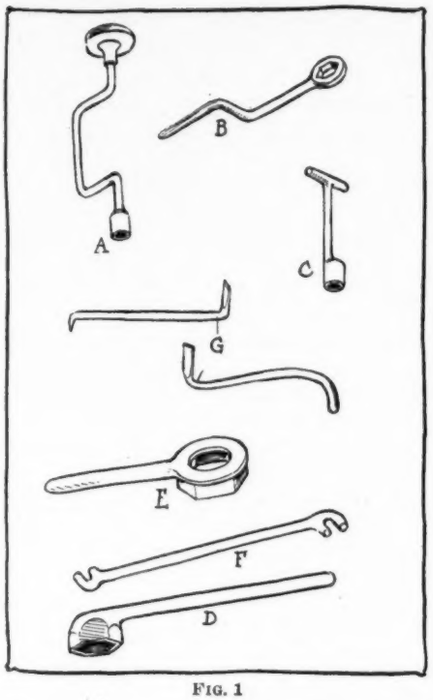


FIG. 1

BEFORE the busy season commences is the time for all good repairmen to equip themselves with tools. In the repair of motor cars there are many cases where special tools are necessary; and there are other instances where, although not exactly necessary, a specially adapted tool will enable the workman to perform an operation with far more ease and in less time than could be done with a standard tool.

For those who would equip themselves with special tools, Motor Age illustrates herewith some of those used in the Chicago shops. Most common among these tools are the many varieties of socket-wrenches, wheel and gear-pullers, valve-spring-lifters and spanner-wrenches. In Fig. 1, A represents a very simple socket-wrench which is found very handy in replacing the oil

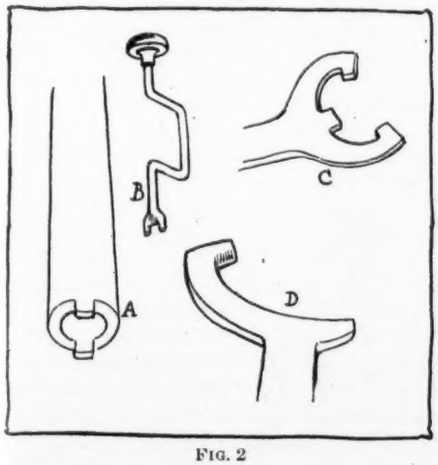


FIG. 2

Value of Special Tools

pan, or lower half of a crank or transmissioncase. It is made in the form of a brace, and is of one-piece construction except that the rest is of wood and free to remain still as the wrench revolves. The shank, or handle portion, is of ⅝-inch stock, while the socket end is made from a piece of 1-inch stock about 1½ inches long which is drawn down at one end and welded to the ⅝-inch bar; a hole, equal in diameter to the small diameter of a ⅜-inch nut, and ⅝ inch deep, is then drilled into the large end; the part is heated to a good working heat; a hexagonal drift, corresponding to the size of a ⅜-inch nut, is driven into the hole; the socket swedged into shape and allowed to cool. It is then turned down in a lathe; the bar is bent to form the brace handle; the socket end again heated to a cherry-red and hardened in cyanide of potassium; the wooden rest attached, and the tool is ready for use. B is a wrench with an offset in the handle, C a socket wrench with an offset socket, and D a wrench whose handle starts off immediately above and at right angles to the socket. E is used in removing cylinder plugs without first removing the spark plug, while F, a heavy iron bar 2 or 3 feet long, with short parallel lugs at each end, is found useful in straightening lamp-brackets, stephangers and various rods about a car. Offset screwdrivers G, are often appreciated in a machine shop. In Fig. 2 are shown a couple of spanner wrenches and one or two other tools that are quite uncommon but quite necessary in the work to which they are adapted. A is made from a piece of steel tubing and used on packing glands—the tube to slip over the shaft—and the small lugs at the end engage corresponding recesses in a packing nut. B is representative of a valve-grinder, designed especially for the valves in certain motors. The spanner C is required to conveniently remove certain types of cylinder plugs; while D, which approaches the conventional, is used in adjusting bearings of a particular type.

There is probably a greater variety of wheel and gear pullers now in service than of any other special tool. In Fig. 3, A looks very much like the standard adjustable wheel and gear puller for sale in all supply houses; and it practically is the same except that the hooks are larger and twisted in opposite directions and at right angles to the beam. It is found useful in removing road and fly-wheels and the like. B is a non-adjustable tool made especially for removing fly-wheels. C and P are road wheel pullers, and are included in the regular equipment of

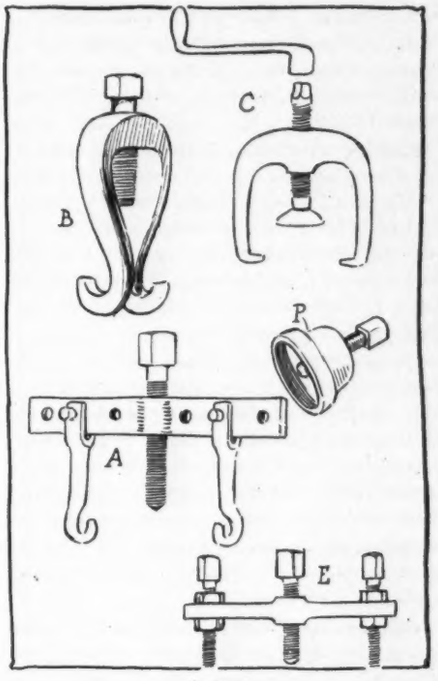


FIG. 3

tools supplied with the cars of two prominent manufacturers. C is part of the Rambler tool equipment and is used in connection with their spare wheel; and P represents the type of wheel puller supplied by the Pierce-Arrow. E is a gear-puller designed to remove the half-time gears of an Oldsmobile, the two side screws being intended to fit into threaded holes in the web of the gears.

In Fig. 4, three types of valve lifters are shown. B and C are of the same principle and quite efficient in almost any case; but A, when properly operated, and on its respective motor, is more quickly applied, and consequently a time saver. D is a valve-seating tool, supplied as special equipment by one of the large motor car manufacturers.

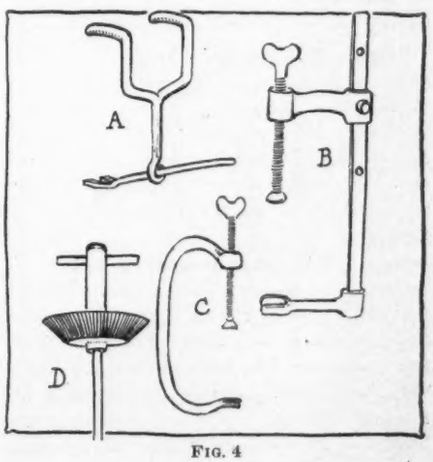


FIG. 4

News from the Motor Clubs

Club at Superior—The Superior Automobile Club has been organized at Superior, Wis., with Wilbur Ross, president; Dr. George Saunders, vice-president; A. T. Roth, secretary, and Dr. J. H. O'Brien, treasurer.

Another Election—The following officers have been elected by the Automobile Club of Niagara Falls: President, A. G. Porter; vice-president, Colonel David Isaacs; secretary, R. Maxon Eaton. The club has 125 members and has decided to continue its fight for an improved highway between Buffalo and Niagara Falls.

Financial Showing Good—The newly-organized Berlin Automobile Club, of Berlin, Wis., has thirty-six members, whose machines, thirty-six in number, represent a total horsepower of 838, and a money value of $49,725, exclusive of special equipment. The club is planning a number of tours to neighboring cities in the beautiful lake region of Marquette and Green Lake counties.

Chauffeurs Form a Club—The first chauffeurs' club in Massachusetts has been formed in Worcester and the club has secured quarters in the Walker building, 405 Main street, which have been comfortably fitted up. Officers for the year have been elected as follows: President, Dayton A. Baldwin; vice-president, William J. Burns; secretary, Walter Moynihan; treasurer, Dr. E. E. Holden; board of governors, Sidney Horton, L. Warren Locke and Charles Brunelle.

Fighting Joy-Riding—In keeping with its spring campaign for better motoring conditions in northern Ohio, the Cleveland Automobile Club is warring upon joy-riding chauffeurs in a most vigorous manner, and through the actions of this body three Cleveland drivers have already had their state licenses revoked. The club intends to keep this fight going from this time forward. As a result of this action the club is coming in for much commendation at the hands of the state registration bureau, as well as the local police force.

Prepare For Orphan's Day—The routes and tours committee of the Quaker City Motor Club, Edwin H. Lewis, chairman, is already hard at work on the details of the orphan's day run, which is scheduled for Wednesday, June 9. The club hopes to entertain at least a thousand children this year, and as a nucleus has already received from the Autocar company, at Ardmore, an assurance of accommodations for 100. Besides this, a score of members have promised their cars for the day—and the committee has been on the job but a very few days. A sub-committee is arranging with the local traction company to have the free use of Willow Grove park and its attractions from 11 to 3 o'clock on orphan's day, while the commissary promises to be even more liberally provided for than in former years.

Club at Alton—The car owners of Alton, Ill., met Monday night, and formed a temporary organization. Permanent organization will be perfected next week, and will be known as the Alton Motor Car Club. The object of the organization at this time was to complete arrangements for a race meet to be held in St. Louis in the late summer, probably at Sportsman's park. Negotiations are now under way for permission to use the park.

Syracuse Club Has Office—The Automobile Club of Syracuse has opened permanent offices at room 204 in the Sedgwick, Andrews & Kennedy building. There will be a stenographer permanently located in the rooms who will impart information to traveling tourists who are invited to make the office their headquarters while in the city. Blue books, road maps, state laws and all information desired by tourists will be kept on the tables for ready reference. Over 100 route, road and crossing signs have been received at the office of Secretary Wilkinson ready for placing around the various roads of the country.

Fuller Reëlected—At the third annual meeting of the Connecticut Automobile Association, held at New Haven, last Saturday, W. F. Fuller, of the Automobile Club of Hartford, Conn., was reëlected president for the ensuing year. F. T. Staples, of the Automobile Club of Bridgeport, was elected vice-president; W. T. Dill, of the Automobile Club of New Haven, treasurer, and John M. Brooks, of the Litchfield County Automobile Club, was elected secretary. The state association membership during the past season has increased about 50 per cent, there now being approximately 1,071 members on the membership roll.

Like Quaker Runs—The success which attended the recent roadability run of the Quaker City Motor Club has attracted the attention of the contest committes of several other clubs in Philadelphia and vicinity, and the near future will see one or more similar stunts. The new Century Motor Club will call its affair, which is scheduled for Sunday, May 16, a sociability run. The route will be about 75 miles, and will touch Bryn Mawr, King of Prussia, Norristown, Ambler, Three Twins, Willow Grove, Hatboro, Southampton and Cheltenham. The Athletic Club of Philadelphia will have a legal speed run the previous afternoon to its clubhouse at Essington. The distance is only about 12 miles, and the select time will be based on a mile in 4 minutes. The Centurions already have over forty entries, and as many of the local tradesmen are members of the athletic club they are pushing the Orchard run for all they are worth.

Gets After the City—In a vigorous set of resolutions, adopted by the Cheyenne Motor Club, the city was urged to purchase a modern road-making machine; raise the street to the grades as established by law; improve the conditions of the crossing, and grade, gravel and roll the streets and thoroughfares as may be found practicable.

Enjoy Beefsteak Dinner—The Milwaukee Automobile Club gave a beefsteak dinner in the rooms of the Milwaukee Athletic Club on Saturday night and nearly 650 members and friends were present. The affair was arranged as a booster for the activities of the club during the season of 1909, during which period it is intended to build a $12,000 clubhouse, hold several reliability runs, conduct a few tours and a contest meet. The members sat on empty beer kegs with a cracker box as a table, a large broiled steak as piece de resistance, and Milwaukee brew, Milwaukee bread and Milwaukee cigars on the side.

Put up Road Signs—Twenty-nine signs were placed on the Omaha-Fremont road Sunday by a party of owners, headed by President W. R. McKeen, of the Omaha Automobile Club. The signs, which are in the form of an arrow, were placed at a distance of every 5 miles and at crossroads and forks of the road, where tourists are liable to become confused as to the proper course. They are in the shape of an arrow with the words "to Fremont" at the top and the distance from Omaha on the bottom. Later it is planned to place similar signs on the Calhoun and Blair roads.

Cleveland After Scorchers—Because of the repeated violations of the law by reckless drivers, the officers of the Cleveland Automobile Club have joined hands with the police in an effort to put a stop to the speeding. For some time past the police have threatened to put on a drastic campaign against all speeding, as well as pushing through an ordinance limiting all motor cars to 8 miles per hour in the city limits. Aroused by repeated accidents and the attitude of the police bicycle squad, President Bonnell, of the club, has sent out a vigorous letter to all members, calling their attention to the impending crusade. Coöperation is asked, while the club will once more put into operation the speeders' bureau. Club members may report to this bureau any violator, and the owner of the machine is then notified by the club. Repeated violations of the warn-

ing are brought to the attention of the police. This system never fails to work, and the club officials are confident they can cut down the speeding which is now menacing the liberty of the motorist.

Election at Janesville—The Janesville Automobile Club, of Janesville, Wis., has elected the following officers: President, Dr. R. W. Edden; vice-president, M. R. Osborn; secretary and treasurer, Frank H. Blodgett; committee on legislation, N. L. Carle, P. H. Korst and E. T. Brown.

From New Haven to Hartford—Members of the Automobile Club of New Haven held a club run to Hartford, Conn., Saturday, stopping for lunch at the Hotel Garde. The party numbered about 125 and occupied thirty cars, leaving the Elm City at 11:51, the first car reaching Hartford about 12:30. A few breakdowns were reported along the road from New Haven to this city by way of Middletown. The return trip was made at 3 o'clock, the party going by way of Farmington and Cheshire.

Bridgeporters Active—At a meeting of the board of governors of the Automobile Club of Bridgeport, Conn., Assistant Secretary H. M. Lyon was instructed to send notices to all members regarding the trap in the town of Darian. It seems the town officials have been arresting and fining motorists who did not blow their horn at the viaduct. President F. T. Staples reported attending a meeting of the state directors in New Haven. At that meeting it was voted to support an amendment to the proposed motor law doing away with the motor commissioner with unlimited power and providing for a registration official in the secretary of state's office, who shall have power to appoint a deputy to investigate cases of reckless driving, etc., with specified fees attached.

Philadelphia Club's Growth—At the recent meeting of the board of governors of the Automobile Club of Philadelphia sixty-three new members were added to the rolls, making a total of 740 in good standing. It was decided to set the maximum limit of membership at 1,000, as the club has not at present the facilities to take care of a greater number. The club charter has been so amended as to permit of an increase in the number of directors to not fewer than nine nor more than twelve, the terms of one-third to expire each year. The touring information committee and the maps, routes and signposts committee were combined under the chairmanship of W. O. Griffith. Arrangements have been made whereby members can secure fire or liability insurance, or both, at greatly reduced rates. Warnings of speed traps located at the following points were given: On Broad street from Susquehanna avenue to Dauphin street, 550 feet; on Island road, between Bow creek and Essington; on Montgomery avenue between Cherry Lane and Church road; and on the White Horse pike, at Elwood, N. J. Warning was also given that arrests are being made for failure to sound horn signals on the road leading from Doylestown to Buckingham. In view of the recent prosecutions for smoky exhausts in Fairmount park, members are urged to make for the nearest entrance at once.

Malden Club Election—The annual election of the Malden Automobile Club, of Malden, Mass., resulted as follows: President, Alvin E. Bliss; vice-president, T. J. Springall; secretary, Herbert A. Gidney; treasurer, J. B. Robbins; board of governors, Dr. F. W. Plummer, A. B. Tenney, William Niedner, J. B. Barrett, C. W. Small, Philip V. Mingo and C. P. Cubberly.

Club to Have Bungalow—Twenty-five acres of ground has been purchased at a cost of $3,000 by the Portland Automobilo Club, of Portland, Ore. As soon as plans can be drawn and contracts awarded the erection of a bungalow clubhouse will be started. There has been great activity among the club members during the last month and an active campaign for new members will be carried on.

Chauffeurs Are Cozy—The Philadelphia branch of the Professional Chauffeurs' Association of America, now numbering about 125 members, is the latest addition to the Quaker City's club life. Last week these hustling wheel-handlers opened a handsomely appointed clubhouse at 1933 Spring Garden street, and the open house entertainment held in connection therewith was the talk of the row all week. The building is equipped with a restaurant, barbershop, sleeping apartment, reading room, billiard and card rooms—indeed, all the accessories of an up-to-date club—and within the next year the energetic managers hope to have on the membership rolls the name of every first-class chauffeur in the city. The present officers of the local branch are: John R. Talis, president; Oscar Moll, first vice-president; H. C. Brownback, second vice-president; A. A. Deighton, treasurer; W. H. Lescher, corresponding secretary, and C. E. Stevenson, recording secretary. The Automobile Club of Philadelphia has already officially sanctioned the organization.

JAY NORTHRUP, SPOKANE, FRANKLIN DRIVER

Milwaukee Buys a Site—The Milwaukee Automobile Club has purchased a site for its clubhouse and by the time the Glidden tourists pass through Milwaukee, the new home, which will be located on the route going out of Milwaukee, will be completed. The site is at the corner of Blue Mound road and Cottrell avenue, just 5 miles from the city hall in Milwaukee and comprises 5 acres, for which was paid $800 an acre. Work started this week on the erection of the clubhouse, to cost $10,000. It will be of reinforced concrete construction, embellished with cut stone, with a rustic effect. It will be two stories high.

Guyon Miller President—At the first election of the just organized Motor Club of Chester County, at West Chester, last Friday night, Guyon Miller, of Downingtown, was elected president; Edwin T. Moore, of Coatesville, first vice-president; George W. McFarland, of West Chester, second vice-president; Fred W. Speakman, of Coatesville, secretary, and Dr. Horace S. Scott, of Coatesville, treasurer. Dr. Edward Kerr, of Downingtown, was appointed chairman of the roads committee; and Walter E. Greenwood chairman of the law committee. The club has sixty-five members, and a resolution to join the Pennsylvania Motor Federation was unanimously adopted.

Club Tour Arranged—The Superior Automobile Club, of Superior, Wis., will hold its first club tour next week. The purpose will be to investigate the condition of the highways within a radius of 25 miles or more of the Head-of-the-Lakes. The club has already asked the Superior common council to remedy conditions in the city. A committee has been appointed to consult with the city attorney in regard to the prosecution of persons who continually throw gravel, stones, mud and other missiles at passing cars. President Wilbur Ross says that the club plans to stop violations of the law on the part of drivers and has a right to demand the same of non-owners.

Detroit Committeemen—President Christian H. Hecker, of the Automobile Club of Detroit, has named the following chairmen of committees for the year: House, E. H. Jewett; law and ordinances, A. F. Peck; auditing, Homer McGraw; good roads, Edwin S. George; entertainment, H. Skillman; membership, H. L. Walker; exhibitions, tours and contests, Stanley Brooks. The club has decided to dispense with the annual reliability tour this year and the labors of the last mentioned committee promise to be very light, in view of the attitude of the club which has placed itself on record as of the opinion that tours and other competitions are largely within the scope of the trade.

Among the Makers and Dealers

New Pierce Addition—It is announced that a new $50,000 addition will be built to the factory of the Pierce-Arrow company, of Buffalo. Reinforced concrete will be used.

Making Metal Bodies—The Barndt-Johnston Auto Supply Co., of Columbus, O., has equipped its factory with machinery for the manufacturing of metal bodies of all styles and classes. It make a specialty of taxicab bodies.

In New Office—Wheeler & Schebler, Indianapolis, Ind., manufacturers of the Schebler carbureter and the W. S. magneto, are now occupying their newly-fitted up offices in their building at the corner of Shelby and Sanders streets.

Sultan Moves—The Sultan Motor Co. has moved into its new show rooms in New York city at 1659 Broadway, where it will carry runabouts, town cars and taxicabs. The executive and sales departments will be located there, but the factory will remain in Springfield, Mass.

Merritt Resigns—R. M. Merritt has resigned as New England manager of the Hoyt Electrical Instrument Works to become associated with the Wetmore-Savage Co., Boston. E. W. Carter will look after the New England interests of the Hoyt Electrical Instrument Works, the change taking effect May 1.

Axle Plant Busy—The Timken-Detroit Axle Co. expects within 6 weeks to have 800 men employed at the new Detroit plant which will be devoted to axle construction exclusively. The active heads will be Messrs. Lewis, Alden and Demory from the Canton plant and W. H. H. Hutton, of Detroit. Hutton leaves the employ of the Chalmers-Detroit company to join the new Timken venture. For about 2 years past he was with Chalmers, latterly specializing on product volume. He has carried in succession the titles of purchasing agent, assistant factory manager and assistant to the secretary.

Studebaker in Portland—The Studebaker agency at Portland, Ore., is now installed in its new garage at Chapman and Alder streets. The new quarters are in a four-story brick building.

Moon in Florida—C. R. Ledbetter, representing the Moon Motor Car Co., of St. Louis, has just closed a large agency contract with Wilson, Trawick & Denham, of Tampa, Fla., who will represent the Moon in their city and lower Florida.

New Locomobile Branch—A new branch of the Locomobile Co. of America has just been opened in San Francisco at 226 Van Ness avenue. It is in charge of Irving J. Morse, who until recently was manager of the Locomobile branch in Philadelphia.

New Garage Opened—The big new garage of W. E. Dineen at Cheyenne, Wyo., was opened to the public on May 5. The garage was decorated with many lights suspended from the ceiling and the evening was given over to a ball on the floor of the building. The garage has a floor space of over 8,000 square feet, the main room being 132 by 60 feet.

May Move to Milwaukee—The Pierce Motor Co., of Racine, Wis., recently incorporated with a capital stock of $300,000 to succeed to the business of the Pierce Engine Co., and to manufacture motor cars on an extensive scale, may remove its plant to Milwaukee, Wis. Options have been obtained on a tract of land in the Menomonee valley, the manufacturing district in downtown Milwaukee. The reason for the proposed removal is that the present Pierce plant is entirely too small and not enough land can be purchased in the immediate vicinity for additions. The plan is to erect a large plant in Milwaukee at once, the Racine plant being used in the interim.

SHOWING PORTION OF PLANT OF BRISTOL ENGINEERING CORPORATION

New Valveless Engines—The Wisconsin Machinery and Mfg. Co., Canal street and Muskego avenue, Milwaukee, Wis., is placing on the market new two-cycle, three-port engines, in sizes of 7 to 50 horsepower, suitable for high grade cars, trucks and motor buggies.

Bellevue's Garage—The Bellevue Automobile Repair Co. has opened a new garage and sales room on Meade avenue, Bellevue, Pa. It will handle the Jackson and Buick cars with a full line of accessories. George J. Kurtz is president and manager and H. J. Erhardt secretary and treasurer.

Cole Making High-Wheels—The Cole Carriage Co., of Indianapolis, Ind., is arranging to build 500 four-cylinder 30-horsepower cars for next season, in addition to its regular line of high-wheel cars. Contracts have already been placed for the four-cylinder motors required, and active preparations are being made to get the new car on the market soon.

More Room For Hupp—The Hupp Motor Co. announces the drawing up of plans for a new motor car factory in Detroit, to be built on a portion of the site at present occupied by the deserted plant of the Olds Motor Co. on Jefferson avenue. This was the first factory at which motor cars were made in Detroit on a large scale. Building operations will begin very shortly.

Packard Horsepower—People who buy motor cars are not purchasing brick and steel power houses, but it may interest them to know what is back of the cars they buy. The illustration shows some of the new engine instalment for the power plant of the Packard Motor Car Co., Detroit, 3,000 horsepower added to 2,000 horsepower, while the back wall of the new power house is still a temporary one because the future may need still more horsepower.

Will Make the Federal—The Industrial Automobile Co., Elkhart, Ind., has been organized with $75,000 capital, and has nearly finished a new building, which it will occupy within a week or so. This concern has bought out the entire stock, material, rights and good-will of the Rockford Automobile and Engine Co., of Rockford, Ill., and will continue building the Federal car, a machine equipped with two-cylinder 14-horsepower opposed motor, water-cooled, sliding gear transmission, multiple disk clutch and 36-inch wheels with 1¾-inch solid tires. The company will also build a two-cylinder air-cooled

motor, of the opposed type, 4½ by 4½, giving 16 horsepower. It will have planetary and sliding gear transmission, control sets and clutches.

Made a Mitchell Man—George Bremner, of Portage, Wis., has been appointed agent for the Mitchell. A garage has been opened in the Schulze building on Wisconsin street.

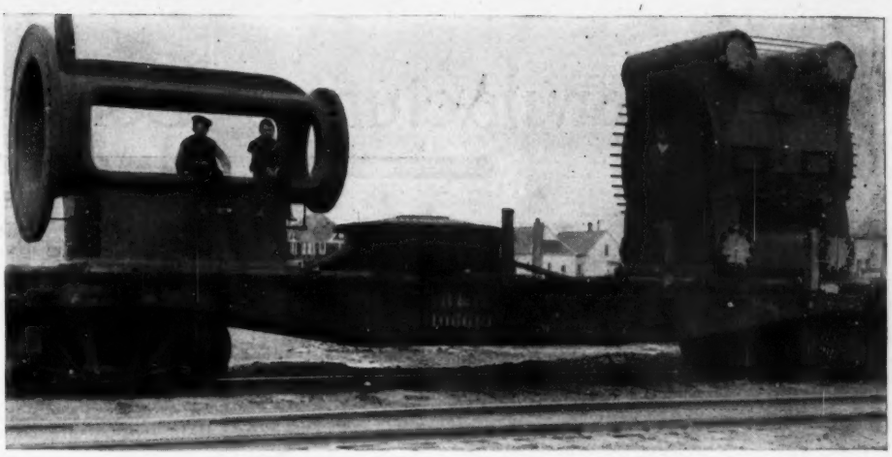
Now an Agency—The Chalmers-Detroit Automobile Co., of Indianapolis, a sales branch, has gone out of business, the Indiana agency having been taken over by the Indiana Automobile Co. Frank Fanning and Frank Haynes, who conducted the branch, have both taken positions in Philadelphia.

Bristol Busy—The Bristol Engineering Corporation, of Bristol, Conn., has recently secured the old J. H. Sessions plant and fitted it up as the final assembling shop for motors and transmissions. In addition it has the premises owned by the New Departure Mfg. Co., while the plant of the C. G. Garrigus Machine Co. is devoted to the Bristol work. All these plants are working night and day.

Big Store Opened—James L. Gibney & Brother, Philadelphia agents for Continental tires, on Saturday last opened their big new accessories depot at 215-217 North Broad street. It is claimed to be the largest and best-equipped establishment of the kind in the state of Pennsylvania. William Taylor, manager of the Philadelphia Oldsmobile branch, whose territory extends far into the southern field, has just established a sub-agency at Rocky Mount, N. C.

Overland Orders Parts—Toledo people are confident that the Overland Automobile Co. intends to make good in its deal for the Pope plant, as a large order was received in Toledo last week from Indianapolis for parts for the Overland car. The order was for camshafts for the engines and was received by Harold Pope, manager of the Toledo factory. The trouble over the title has been cleared up and it is believed by Toledo business men that this order is an indication that the Overland company is anxious to become established in that city and that the Toledo plant is as good as sold.

Many Crankshafts Ordered—Contracts for furnishing 75,000 crankshafts for 100,000 cars which will be manufactured in this country during the season of 1909, have been placed with the Wyman & Gordon Co., of Worcester, Mass., and orders for next year's crankshafts are being delivered at the present time by the concern. The concern states that only about 1,000 of the cars to be made will be equipped with single cylinders, 55,000 of them will have four cylinders and 35,000 six cylinders. Of the 100,000 cars to be thus equipped, Worcester manufacturers estimate that about 45,000 will go to people who have never before owned cars, 10,000 will be used for demonstration and rental cars, of which 6,000 are taxicabs and limousines.



SOME OF THE NEW MACHINERY FOR THE PACKARD PLANT

The balance of the cars will go to owners changing from old to new models, which will mean about 40,000 second-hand cars for the dealers to dispose of.

Still Carries the Stoddard—The Swingley Motor Car Co., of St. Louis, which recently added the National line, has not given up the Stoddard-Dayton agency as was stated in a recent issue of Motor Age.

Building Rivetless Car—The Owen Thomas Motor Car Co., of Janesville, Wis., manufacturer of the O.-T. Six, has installed a Monarch oxy-acetylene welding machine in order to carry out the idea of a rivetless car. The first cars will be out within the next 2 weeks.

New St. Louis Organization—The accessory dealers of St. Louis have completed a temporary organization with Frank Bishop, of the Phoenix Auto Supply company, president. The object of this association is to be separate from the dealers' association.

MacAlman Represents Motorists—President John H. MacAlman, of the Boston Automobile Dealers' Association, was the representative of the motor industry who accompanied the members of the Boston merchants on their trip through northern New England last week to bring about closer trade relations and boom that section of the country.

Steel Car Company Buys—The United Railways Co., of St. Louis, has placed an order for two roadsters to use in its trouble and line departments. The cars are to be fully equipped. The street railway company a year ago bought its first motor car. J. E. Burgess, of the company, has driven this car 12,000 miles within that time.

Big Orders for Remys—The Remy Electric Co. reports among its 1910 contracts one for 30,000 magnetos for the Buick concern and one for 1,600 with the Overland company. With the signing of contracts with these firms the company let contracts for new buildings to be completed by August 1, which it is expected will give a daily capacity of 1,000 instruments. The new buildings will be duplicates of the old ones, being long and narrow, affording plenty of light. All will be of brick, concrete and steel. The company purposes adding to its line a smaller-sized instrument for motor buggy use.

Atlas Rubber Co. in Hub—The latest addition to the Boston motor industry is the Atlas Rubber Co., which has secured headquarters at 741 Boylston street. The local manager is J. S. McClurg.

Making Cables—The Diamond Rubber Co., Akron, O., is making primary and secondary cables for motor car ignition systems. Its line includes rubber-covered cables and wires of all sizes, and intended for all purposes.

Joining Kissel Forces—H. K. Butterfield, United States district attorney at Milwaukee for 8 years, and whose term has just expired, intends to take an active part in the management of the Kissel Motor Car Co., of Hartford, Wis., in which he owns a large interest, as soon as his successor is appointed. He will retire from the practice of law.

New Goodrich Building—Manager Howard B. Limric, of the Boston branch of the B. F. Goodrich Co., states that plans have been completed for a new home for the Goodrich tires in the Hub. Two dwellings at 851 and 855 Boylston street, in the center of the motor trade, are to be torn down and a six-story building erected for the Goodrich firm. It will have a frontage of 44 feet and be 112 feet deep. Work will begin July 1 and the new building will be finished about January next.

Becomes Studebaker Branch—Formal announcement has been made over the signature of E. Leroy Pelletier, advertising manager of the Everett-Metzger-Flanders Co., that the Detroit retail branch, formerly conducted at that factory under the charge of Harry Cunningham, will be continued in the future as a branch of the Studebaker Automobile Co., Mr. Cunningham remaining in charge. Mr. Cunningham was in Cleveland for several days this week, in search of a suitable location for the erection of a large garage and salesroom to take care of the Studebaker retail interests there.

Manufacturers' Communications

MOTOR BUGGY TIRES

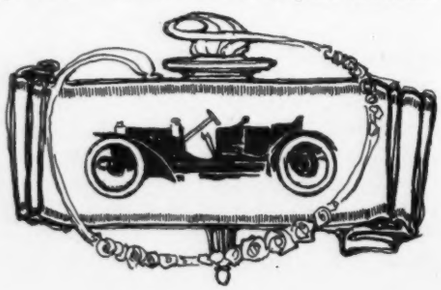
AKRON, O.—Editor Motor Age—In a recent issue of Motor Age there appeared an article on the subject of motor buggy tires containing the following: "The pneumatic tires should be as large as possible and the solid tires should be the reverse." As relates to the latter sentence, our experiments have all led to a different conclusion. Tires are far oftener too small than too large. A solid tire that has too small a cross section or is too high and narrow, flattens out too much under its load. Rubber has a certain amount of life and if persistently overworked in this manner it cannot recuperate. We made thorough tests with small tires on a testing car. It was found upon running over car tracks, rough pavements and road irregularities that the tire did not have enough body. The displacement of the rubber allowed the channel to frequently strike and hammer itself out of shape. There was considerable sharp jarring on machinery which loosened the joints and tended to crystallize the bearings. The passengers felt considerable discomfort on account of these shocks. Rubber cannot be compressed like air; it can only be displaced. In the pneumatic tire the road obstructions are absorbed by compression of air. In solid tires displacement of rubber takes care of the blow. The amount of resiliency secured from the solid tire depends upon the amount of rubber displaced. Long experience under varying conditions has produced a schedule of proper sizes per load. From this it is seen that tires may be too small or too large for ultimate economy. Second only to quality of rubber and size of tire is the firmness of its anchorage in the channel, enabling the tire to withstand the severe strain of driving at speed over rough roads and around corners, without forcing it out of the channel. Our experience has abundantly proven that real economy is in the larger sizes of tires as possessing greater volume of rubber, stronger fastenings such as cross-bars, wire, etc., and more protection to the mechanism of the car from shocks of road travel which it encounters.—H. S. Firestone.

BICYCLE AND THE MOTOR CAR

Buffalo, N. Y.—Editor Motor Age—It is frequently remarked by those associated with the motor car business, as well as by comparatively unthinking laymen, that the motor car business will follow in the footsteps of the bicycle business. This statement is generally accepted as a sage prophecy, the unthinking prophet assuming to himself the virtue of wisdom. But the history of the rise and fall of the bicycle business will not be repeated in the motor industry. As one of those associated in the bicycle business, and conversant with the history of the transition from the bicycle to the motor car as a means of transportation, I have made a careful study of the problem and arrived at certain conclusions. The only common element of the two industries, aside from each representing a method of locomotion, arises from the fact that the early development of the motor car in a commercial way occurred at a time when the bicycle business, as a large industry turning out a popular product, had commenced to wane, its doom being plainly written.

The situation was such that a large amount of capital, energy, producing and selling brains was rendered comparatively idle, and consequently those forces were logically attracted to the motor car business which had alluring prospects, and called apparently for the same essential elements. Thus several of the earlier bicycle makers were pioneers in motor car development; and many mechanics, theretofore engaged in the bicycle industry, being skillful in detail, have in minor capacities aided motor car development in either invention or shop practice. Naturally the motor car attracted to it a selling force, including bicycle dealers. The latter brought into the new industry a rich experience, which unfortunately too few of them realized to the fullest extent, particularly as to the proper function of adversity. Many of them transplanted lax business methods, extravagances and other undesirable phases. They were fond of referring to the new industry as a game, as to a sporting event, or a hand at poker. Early the old selling methods began to show themselves in installment sales and questionable methods of attracting and holding business. But in the new industry these elements were, naturally, short-lived. Their retribution has been swift. As I see the motor industry today, it has in no sense any remaining similarity to the old bicycle business, excepting in the enormous favor which the buying public has bestowed upon it.

Many people are prone to say that overproduction killed the old bicycle business.



But if the would reflect on the decreased number of wheels in use, I think the answer is obvious. The bicycle was comparatively short-lived on account, in my judgment, of its own limitations. In its day it was regarded as a wonder of convenience in the solving of the essential transportation problem of how best to accomplish a given distance on common roads. It also had the fascination of a healthy outdoor exercise. But it always involved more or less hard work, more or less of the discomforts of the road, and always the limitation of the rider. It, moreover, did not admit of discrimination whereby the love of display, the superiority purchasable by money, or the essential comfort of the individual, could be expressed. As the result of the expenditure of an enormous amount of money and work by the American pioneer makers, nearly all of whom are members of the Association of Licensed Automobile Manufacturers, the motor car as a means of transportation has become a part of our national life. It is rapidly supplanting the older forms of individual mechanical locomotion; and will endure because it not only supplants, but far surpasses, anything of its kind we ever have known. It will not decline but grow, because ever since civilized man has been obliged to move from place to place, for pleasure, convenience or profit, he has had to use the horse, the mule or the camel, with much limitation in point of distance and speed, and at all times with uncertainty.

The new means of common road transportation is untiring and limitless. It has proven itself to be what the people want. It has individuality in form, and variety, and is built to suit any purse. When it is realized that, even in view of the motor industry, horse-drawn vehicles for pleasure purposes only are still produced in quantity closely approximating a million per year, is it not a fair assumption that a very considerable supplanting will be done year by year, until eventually the urban and interurban individual traffic will all be accomplished by mechanical traction? Facing these facts, it cannot in any sense be said that the history of the bicycle will be repeated in the case of the motor car. In the minds of thoughtful people, of those who think conservatively, the motor car as a means of conveyance has but one menace to its supremacy, and that is navigation of the air, which, if successfully accomplished as to safety and economy, undoubtedly will make the motor car in a way old-fashioned. But even when that day arrives, there will still be numberless people who prefer to be on the ground.—Charles Clifton.

Brief Business Announcements

Newark, N. J.—F. W. Briggs has opened the Imperial garage on Belleville avenue.

Bamberg, S. C.—The Delk Motor Co. has opened a repair shop in this place.

Pittsburg, Pa.—The Duquesne Motor Car Co. has been appointed local agent for the Selden.

Boston, Mass.—Fred Adams has been appointed New York manager for the Atlas Motor Car Co.

Cleveland, O.—Announcement has been made that the Peerless Motor Car Co. is to increase its capital stock from $600,000 to $3,000,000.

Kansas City, Mo.—The International Auto Supply Co., agent for the Oakland, has opened its new garage at 1107 East Fifteenth street.

Quincy, Ill.—Massey & Sons are erecting a one-story garage on North Fourth street, and expect to occupy the new premises within a month.

Oshkosh, Wis.—H. Kurz and C. Koenig have organized the Wisconsin Tire Repair Co. and have installed a vulcanizing plant at 186 Main street.

Long Branch, N. J.—Henry M. Fitch and David Thompson have leased the Broadway plant of the Long Branch Auto Garage and Supply Co.

Chicago—B. C. Hamilton has been appointed agent in the west for the Chadwick, and has established headquarters at 1218 Michigan avenue.

New York—The White Tire Co. has opened headquarters at Broadway and Seventy-second street, under the management of Alexander Saxe.

Newark, N. J.—John Gifford, who has been connected with the Prudential Insurance Co., has leased the Parker garage, at Frelinghuysen avenue and Wright street.

Springfield, Mass.—S. J. Rosenfield, of the Siro Carbureter Co., has announced that he is seriously considering the offer to remove his factory to a Connecticut city, the name of which has not yet been made public.

San Diego, Cal.—Wilson S. Smith, who has the local agency for the Franklin, has incorporated a company with a capital stock of $25,000 to run the business, and has let the contract for the erection of a garage building.

Milwaukee, Wis.—Julius Andrae & Sons Co., one of the largest electrical supply houses in Wisconsin, and agent for accessories and supplies for motor cars, on May 1 consolidated its salesrooms, warehouses and manufacturing plant in the six-story building at 118-120 Sycamore street, Milwaukee. The house of Andrae was established 50 years ago.

Boston, Mass.—P. O. Sheenan has been appointed city salesman for the Republic Rubber Co., of New York city, and will made his headquarters at the local branch, 735 Boylston street.

Temple, Tex.—Dr. A. C. Scott, J. W. Wiley, of this town, and Albert Felton, of Pennsylvania, are the prime movers in a company which has been organized here to conduct a garage.

Newark, N. J.—The Martin Auto Co., of Halsey street, is planning to install an accessories department. Improvements are being made on the second floor of the garage, which has previously been devoted entirely to the repair department, but part of which is to be devoted to the new venture.

Boston, Mass.—A new company, to be known as the Boston Electric Garage Co., is in process of organization. The new concern will conduct a garage business for electric cars only, and is also to act as local agent for the Detroit electric. N. Rommelfanger, formerly with the Edison company as a battery expert, is to be president of the company, while the post of treasurer is to be filled by James A. Binney. A new building is to be erected at 321-323 Columbus avenue.

RECENT INCORPORATIONS

Rochester, N. Y.—Garny-Mehserle Machine and Auto Co.; capital stock, $2,000; to manufacture motors, engines, wagons, cars and vehicles of all kinds; incorporators, George and Theresa Garny, Henry and Katherine Mehserle.

New York—L. B. Repair Co., capital stock $10,000, to deal in and repair motor cars; incorporators, J. A. Lewis, F. H. Bonner and W. A. Rue.

Bridgeport, Conn.—American Specialty Co.; capital stock, $10,000; to engage in the manufacture of bicycle and motor car parts; incorporators, Louis and Samuel Silverstein and Samuel Cohen.

Morristown, N. J.—North Jersey garage; capital stock, $25,000; to manufacture motor cars; incorporators, R. H. Nevins, R. S. Foster and H. Archer.

Jersey City, N. J.—Dreadnaught Tire Co., to engage in the manufacture of rubber goods; incorporators, S. Brown, W. L. Hopkins and G. W. Harris.

Alton, Ill. — Charles Siebold Livery and Auto Co.; capital stock, $5,000; to deal in horses and also operate a livery and motor car garage.

New York — Taxicab Rental Co.; capital stock, $1,000; to operate taxicabs, maintain garage, etc.; incorporators, H. M. Browne, E. J. Forhan and J. J. Harper.

Dover, Del. — Metropolitan Taxicab Co.; capital stock, $200,000; incorporators, E. J. Forhan, H. M. Browne and J. J. Harper.

Newark, N. J. — Gifford garage; capital stock, $100,000; to conduct a garage; incorporators, J. W. and Anna S. Gifford and H. D. and C. S. Craig.

Middletown, Del.—Middletown Garage and Repair Co.; capital stock, $2,000; incorporators, M. N. Willets, C. A. Ritchie, J. P. Algire, C. G. Cann and P. B. Smith.

Norwalk, O.—The Auto-Bug Co. has been organized here, and will manufacture high-wheeled motor buggies.

Wilkinsburg, Pa. — The Co-Operative Automobile Co., of 605 South street, has added a power plant to the garage.

Dayton, O.—The Dayton Motor Car Co. is to erect a new six-story building near the present buildings of the company.

Philadelphia, Pa.—The Rainier Motor Co. is about to open a branch in this city under the management of J. Knight Neftel.

San Francisco, Cal.—H. L. Carrish, who has been conducting the Royal garage at 1639 Oak street, has filed a petition in bankruptcy, with liabilities of $2,117.

Milwaukee, Wis.—The Bond Auto Sales Co., 176-178 Thirteenth street, has supplanted the old Schwartzburg-Bond Co. and will continue to deal in second-hand cars exclusively.

Boston, Mass.—On June 1 George L. Osborn, who has been connected with the Stoddard-Dayton and Berliet agencies, will transfer to the office of the Peerless Motor Car Co. of New England.

Glen Cove, N. Y.—The Red Spring Garage Co. has completed the erection of a garage at Landing road and Red Spring lane. E. R. Weeks and Herbert Underhill are the members of the company.

Houston, Tex.—H. B. Wayman, formerly interested in a garage in Dayton, O., devoted exclusively to electric vehicles, has been appointed manager of the electric department of the Houston Motor Car Co.

Des Moines, Ia.—Work has been commenced on the erection of the new garage for the Ideal Auto Co., and it is expected that the building will be in readiness by July 1. The garage is located on Seventh street, between Grand and High.

Great Falls, Mont.—The Montana Auto Tire Repair Co., a new concern, claims the distinction of being the only tire repair company in the state. Arthur Wright, for many years with the Chicago Tire Repair Co., of Chicago, is manager.

Philadelphia, Pa.—The local branch of the Fisk Rubber and Tire Co., which has been located at 1309 Race street, has found these quarters too small for the rapidly increasing business, and has removed to 258 North Broad street.

Ann Arbor, Mich.—It is likely that the Carter Motor Car Co., of Washington, D. C., will erect a plant in this city. Howard O. Carter has been in the city looking for a suitable location for a large factory. The Carter company now has a factory at Hyattsville, Md.

Development Briefs

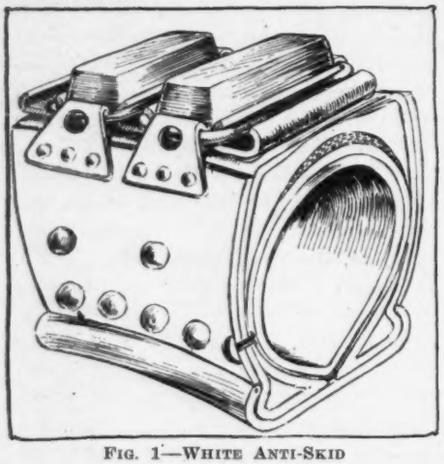


FIG. 1—WHITE ANTI-SKID

IT MEASURES CYLINDERS

A RECENT European inventor has perfected a simple device for measuring the diameter of a cylinder without dismounting it. This apparatus is illustrated on this page and can be inserted in the cylinder through the spark plug opening, or the priming cup. The measuring part consists of a pair of hinged arms A and A1 attached at their inner ends to a central support H and hinged through linkages L and L1 to vertical sliding arms, which carry the finger holes F and F1 on their upper ends. Each of the arms A and A1 is entirely independent of the other, the arm A being operated through the finger end F, the arm A1 through the finger hole F1. On the instrument are scales G graduated to show in millimeters the distances B and B1. Two spirit levels E and E1 are provided to insure the apparatus being mounted vertically. Owing to the arms A and A1 being entirely separate it is not essential that the device be inserted into the center of the cylinder, but, as illustrated, the arm A1 may be nearly horizontal and the arm A almost vertical, at which time the total diameter of the cylinder will be the distance B, plus distance B1, which can be obtained in millimeters by getting the total on the two scales G.

BI-CAL-KY AUXILIARY SPRING

The Bi-Cal-Ky Auxiliary Spring Co., of Buffalo, N. Y., has placed upon the market a unique form of auxiliary spring and shock eliminator. This consists essentially of a strip of heavy, flat, sprng steel S, Fig. 2, bent into two separate coil springs C and C1 facing each other and the inner end of each terminating in a stout handle or lever L. These two levers, when in normal position, lie nearly parallel and have their ends connected by a series of links K. The center of this series is fastened to the spring or frame of the car in such a manner that a toggle joint is formed by these links. As the distance between the car spring and frame grows greater or less, the links forming the toggle joint tend to bring the ends of the levers closer together. This motion, however, is resisted by the coil springs with a force increasing as the ends of the levers are brought nearer each other. In this manner, the device acts both as an auxiliary spring and shock absorber.

REMOVES RADIATOR CRUST

The Non-Koroda Co., New York City, manufactures a radiator compound intended to prevent and remove the formation of rust and encrustations on the inner surfaces of radiators, water jackets and connecting pipes in the water-cooling systems of motor cars.

WHITE ANTI-SKID

The White Tire Co., New York, which markets the White tire, has a peculiar non-skid device illustrated on this page. It consists of transverse rubber blocks, regularly spaced across the tire and rigidly secured to a metal base, which base is in turn connected to the adjacent ones by a broad linkage, equal in length to the width of the tire tread. Lateral slipping of these links is prevented by a metal hook on each end which attaches to a leather covering riveted to the side of the tire casing. This anti-skid device is not only casing. This anti-skid device prevents puncturing to a marked extent.

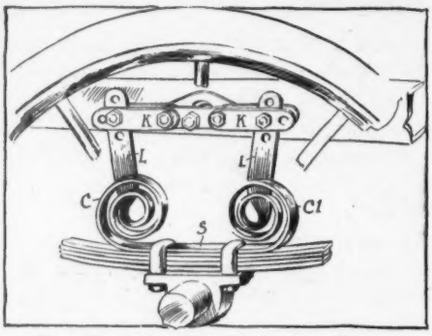


FIG. 2—BI-CAL-KY AUXILIARY SPRING

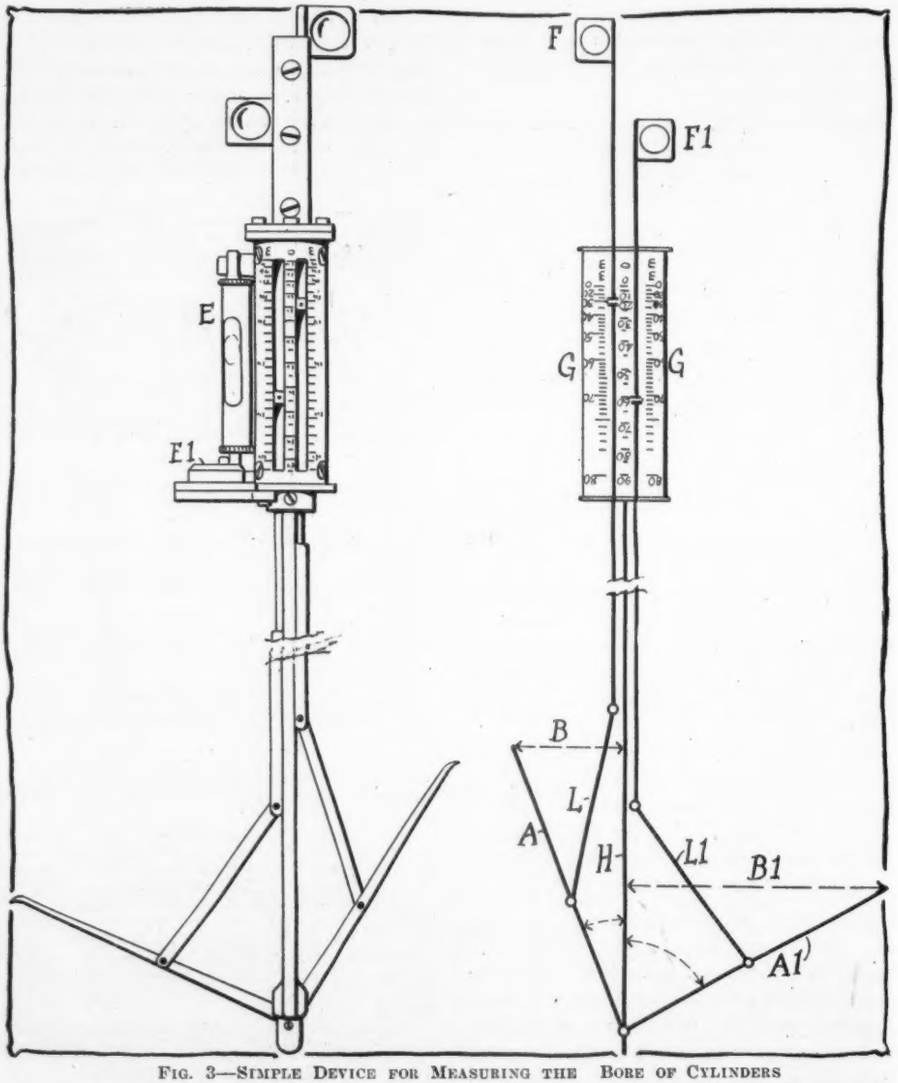


FIG. 3—SIMPLE DEVICE FOR MEASURING THE BORE OF CYLINDERS